POLITECNICO MILANO 1863

PUBLIC SELECTION ESTABLISHED WITH DIRECTOR'S DECREE NO. 2022_PRO_DICA_2 OF 29/09/2022 PURSUANT TO THE NOTICE PUBLISHED IN THE OFFICIAL GAZETTE NO. 21/10/2022, n. 84 FOR 1 POSITION AS FULL PROFESSOR FOR THE COMPETITION SECTOR 08/B2 - STRUCTURAL MECHANICS - SDS ICAR/08 - STRUCTURAL MECHANICS, PURSUANT TO ART. 18 - LAW 240/2010, AT THE POLITECNICO DI MILANO - DEPARTMENT OF CIVIL AND ENVIRONMENTAL ENGINEERING (PROCEDURE CODE 2022_PRO_DICA_2).

FINAL REPORT

The Selection Board, appointed with RD Index No. 12263 ref. No. 270610 of 23 November 2022, composed by the following Professors:

Prof. FRANGI Attilio Alberto - Politecnico di Milano;
Prof. MOLINARI Jean-François - Ecole Polytechnique Fédérale de Lausanne (EPFL);
Prof. MOËS Nicolas - École Centrale de Nantes,

met on January 18th at 17h, 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:

Prof. MOËS Nicolas, Ecole Centrale de Nantes, Chairman;
Prof. FRANGI Attilio Alberto, at 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 February 8th at 16h, the Selection Board met for the second teleconference meeting to inspect the list of applicants, who were:

1) Ardito Raffaele
2) Brighenti Roberto
3) Fedele Roberto
4) Mariani Stefano

5) Placidi Luca

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.
The Selection Board started to examine the documentation submitted by the candidates.

On February 22th at 16h, the Selection Board met for the third teleconference meeting.
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. MOËS Nicolas *(Chairman)*

Nicolas MOËS Digitally signed by Nicolas MOËS Date: 2023.03.06 15:49:02 +01'00'

Prof. MOLINARI Jean-François *(Member)*

9/3/2023

Prof. FRANGI Attilio Alberto *(Secretary)*

POLITECNICO MILANO 1863

PUBLIC SELECTION ESTABLISHED WITH DIRECTOR'S DECREE NO. 2022_PRO_DICA_2 OF 29/09/2022 PURSUANT TO THE NOTICE PUBLISHED IN THE OFFICIAL GAZETTE NO. 21/10/2022, n. 84 FOR 1 POSITION AS FULL PROFESSOR FOR THE COMPETITION SECTOR 08/B2 - STRUCTURAL MECHANICS - SDS ICAR/08 - STRUCTURAL MECHANICS, PURSUANT TO ART. 18 - LAW 240/2010, AT THE POLITECNICO DI MILANO - DEPARTMENT OF CIVIL AND ENVIRONMENTAL ENGINEERING (PROCEDURE CODE 2022_PRO_DICA_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
Ardito Raffaele	23.6	30	13	14	80.6
Brighenti Roberto	27.3	34	13	2	76.3
Fedele Roberto	23.6	30	12	2	67.6
Mariani Stefano	30.3	34	13	5	82.3
Placidi Luca	27.4	30	6	3	66.4

CANDIDATE: Ardito Raffaele

CURRICULUM:

The candidate received an M.S. degree (cum laude) in civil engineering in 2000, and a Ph.D. degree in structural engineering in 2004. He is currently Associate Professor at the Department of Civil and Environmental Engineering of Politecnico di Milano. He was a visiting scientist at Lawrence Berkeley National Laboratory, Berkeley (2006), and at the Massachusetts Institute of Technology, Research Laboratory of Electronics (2008 and 2010). He has been a recipient of the Associazione Carlo Maddalena Prize for graduate students (2000), and of a research fund for your researchers provided by Department of Structural Engineering of Politecnico di Milano (2009).

Also based on the scientific, didactic, funded research and technology transfer activities commented in what follows, the Selection Board expresses a very positive evaluation on the candidate curriculum.

SUBMITTED PUBLICATIONS:

No. of publications	Type/Title of Publication	Judgment
1	Article/Numerical and experimental evaluation of the magnetic interaction for frequency up-conversion in piezoelectric vibration energy harvesters	0.65
2	Article/Selective Mode Conversion and Rainbow Trapping via Graded Elastic Waveguides	0.54
3	Article/3D printing of fine alumina powders by binder jetting	0.54
4	Article/Experimental investigation of amplification, via a mechanical delay-line, in a rainbow-based metamaterial for energy harvesting	0.59
5	Article/A design strategy to match the band gap of periodic and aperiodic metamaterials	0.56
6	Article/Graded elastic metasurface for enhanced energy harvesting	0.68
7	Article/3-D design and simulation of a piezoelectric micropump	0.56
8	Article/Low frequency 3D ultra-wide vibration attenuation via elastic metamaterial	0.72
9	Article/Band-gap structure in two- and three-dimensional cellular locally resonant materials	0.72
10	Book/Mechanics of Microsystems	0.60
11	Article/3D auxetic single material periodic structure with ultra-wide tunable bandgap	0.65
12	Article/Stability of dynamic response of suspension bridges	0.83
13	Article/Mechanical low-frequency filter via modes separation in 3D periodic structures	0.63
14	Article/Electro-mechanical modelling and experimental characterization of a high-aspect-ratio electrostatic-capacitive MEMS device	0.45
15	Article/Shape optimization of solid–air porous phononic crystal slabs with widest full 3D bandgap for in-plane acoustic waves	0.70
16	Article/Modeling and experimental verification of an ultra-wide bandgap in 3D phononic crystal	0.70
17	Article/Improved one-dimensional model of piezoelectric laminates for energy harvesters including three dimensional effects	0.74
18	Article/Advanced models for the calculation of capillary attraction in axisymmetric configurations	0.63
19	Article/On the application of piezolaminated composites to diaphragm micropumps	0.72
20	Article/Modelling of spontaneous adhesion phenomena in micro-electro-mechanical systems	0.74
21	Article/A plate model for the evaluation of pull-in instability occurrence in electrostatic micropump diaphragms	0.63
22	Article/Diagnostic analysis of concrete dams based on seasonal hydrostatic loading	0.74
23	Article/Solid damping in micro electro mechanical systems	0.63
24	Article/On structural safety assessment by load factor maximization in piecewise linear plasticity	0.65
	TOTAL (rounded to first decimal place)	15.6

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 24 submitted publications have been ranked in the table above, with a maximum score of 1 for each publication. The scores have been proposed by taking into account the scientific level of the publication, its relevance for the scientific sector of this selection procedure, criteria and parameters recognised by the relevant international scientific community. The overall score confirms the high quality of the candidate's research. The variety of the topics addressed in the publications presented is excellent, as well as the scientific rigor and the innovative character. The personal contribution of the candidate emerges as original and significant. Thus, the Selection Board evaluates as very good the scientific papers presented by the candidate.

The candidate is author/co-author of 162 publications, of which 70 have appeared in scientific journals having a significant impact factor. Based on the database Scopus, the candidate reports an h-index equal to 22 and an overall number of citations of 1661. The candidate's scientific production is very good and remarkably continuous in time. The research activity has been mainly focused on themes of advanced functional materials, metamaterials, micro-mechanics with application to Micro-Electro-Mechanical-Systems and Nano-Electro-Mechanical-Systems, linear and nonlinear dynamics of solids and structures, mechanics of solids and structures in cryogenic conditions, inverse analysis, direct methods for limit and shakedown analyses. The overall scientific production has been assessed 5/6.

The candidate is member of the Editorial board of the European Journal of Mechanics – A/Solids. He was member of the Editorial Board in several editions of the "CST - International Conference on Computational Structures Technology". He has been guest editor for the special issue "Advanced Locally Resonant Materials", on the journal Materials. These activities of scientific animation have been assessed 3/5.

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

The candidate has been teacher in over 40 academic courses, starting from the academic year 2004/2005. He carried out teaching activity in PhD courses, as well. He has been teaching assistant in several courses, starting from the academic year 2000/2001. He has been the supervisor of 8 PhD theses. He is member of the academic board for the PhD programme in Structural, Seismic and Geotechnical Engineering, Politecnico di Milano and deputy coordinator of the Commission for the final exam of the Master of Science in Civil Engineering, Politecnico di Milano.
Overall, the teaching activity of the candidate and his involvement in management pertaining to the teaching activities, is very good.

SCIENTIFIC RESPONSIBILITY FOR FUNDED RESEARCH PROJECTS:

The candidate is scientific responsible of a research unit in the FET-proactive project MetaVEH – Metamaterials Enhanced Vibration Energy Harvesting, funded by the EU. The candidate is scientific responsible of FUNTASMA – Functional Sintered Materials - interdisciplinary laboratory founded in 2017 and financed by Politecnico di Milano. The candidate is also scientific responsible of the following project with a private company: research line P6 – SOW16, Metamaterials and metastructures for mechanical energy management in MEMS. "Energy-MEMS", within the Research Center on Sensor Systems with Advanced Materials (STEAM Joint Research Center Politecnico di Milano- ST Microelectronics).
Overall, the involvement in research projects is very good, as well as the amount of funding granted.

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 co-inventor of 9 patents, 5 of them national and the remaining 4 international. Moreover, the candidate is the co-founder of a spin-off of Politecnico di Milano, the company Phononic Vibes S.r.l.

SCRUTINY OF THE DEGREE OF KNOWLEDGE OF THE ENGLISH LANGUAGE:

Based on the English language used in the candidate's publication, it can be inferred that the candidate has a very good knowledge of this language.

CANDIDATE: Brighenti Roberto

CURRICULUM:

The candidate received an M.S. degree (cum laude) in civil engineering in 1993, and a Ph.D. degree in mechanics of structures in 1997. He is currently Associate Professor at the Department of Civil-Environmental Engineering & Architecture, University of Parma. He was a visiting scientist at the Laboratoire de Fiabilitè Mecanique, Facultè de Science, Univ. di Metz (1995), at the Department of Mechanical and Process Engineering, Univ. di Sheffield (1995), at Dept. of Construction and Manufacturing Engineering, University of Oviedo, Gijón (2013), at Dept. of Mechanical Engineering, Colorado Univ. at Boulder (2016, 2018), Dept. of Mechanical Engineering, Dortmund Technical Univ. (2017), Institute of Structural Mechanics, Faculty of Civil Eng., Bauhaus Univ. Weimar (2019), Institute of Structural Mechanics, California Institute of Technology (2020).

Also based on the scientific, didactic, funded research and technology transfer activities commented in what follows, the Selection Board expresses a fully positive evaluation on the candidate curriculum.

SUBMITTED PUBLICATIONS:

No. of publications	Type/Title of Publication	Judgment
1	Article/Mechanics of multi-stimuli temperature-responsive hydrogels	0.86
2	Article/Multiphysics modelling of the mechanical properties in polymers obtained via photo-induced polymerization	0.61
3	Article/Mechanical behavior of photopolymerized materials	0.95
4	Article/A micromechanical-based model of stimulus responsive liquid crystal elastomers	0.85
5	Article/Phase field approach for simulating failure of viscoelastic elastomers	0.74
6	Article/Swelling mechanism in smart polymers responsive to mechano-chemical stimuli	0.95
7	Article/Cutting resistance of soft materials: Effects of blade inclination and friction	0.81
8	Article/Mechanics of materials with embedded unstable molecules	0.83
9	Article/The fracture mechanics in cutting: A comparative study on hard and soft polymeric materials	0.63
10	Article/Statistical Damage Mechanics of Polymer Networks	0.90
11	Article/Mechanics of responsive polymers via conformationally switchable molecules	0.74
12	Article/Strain field self-diagnostic PDMS elastomers	0.58
13	Article/A statistically-based continuum theory for polymers with transient networks	0.93
14	Article/Dynamic behaviour of solids and granular materials: a force potential-based particle method	0.76
15	Article/A novel finite element formulation for beams with composite cross-section	0.67
16	Article/Optimal fiber content and distribution in fiber-reinforced solids using a reliability and NURBS based sequential optimization approach	0.79

17	Article/Optimization of fiber distribution in fiber reinforced composite by using NURBS functions	0.61
18	Article/A micro-mechanical model for statistically unidirectional and randomly distributed fibre-reinforced solids	0.67
19	Article/A new discontinuous FE formulation for crack path prediction in brittle solids	0.68
20	Article/Application of the element-free Galerkin meshless method to 3-D fracture mechanics problems	0.88
21	Article/A physics-based micromechanical model for electroactive viscoelastic polymers	0.65
22	Article/Rate-dependent failure mechanism of elastomers	0.74
23	Article/Laser-based additively manufactured polymers: a review on processes and mechanical models	0.70
24	Article/Controlled morphing of architected liquid crystal elastomer elements: modeling and simulations	0.76
	TOTAL (rounded to first decimal place)	18.3

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 24 submitted publications have been ranked in the table above, with a maximum score of 1 for each publication. The scores have been proposed by taking into account the scientific level of the publication, its relevance for the scientific sector of this selection procedure, criteria and parameters recognised by the relevant international scientific community The overall score confirms the high quality of the candidate's research. The variety of the topics addressed in the publications presented is very good, as well as the scientific rigor and the innovative character. The personal contribution of the candidate emerges as very original and can be very easily identified. Thus, the Selection Board evaluates as excellent the scientific papers presented by the candidate.

The candidate is author/co-author of 236 publications, of which 128 have appeared in scientific journals having a significant impact factor. Based on the database Scopus, the candidate reports an h-index equal to 31 and an overall number of citations of 2510. The candidate's scientific production is excellent and remarkably continuous in time. The research activity has been mainly focused on themes of mechanical models for the study of responsive materials, development of discrete element models, composite materials, computational approaches to fracture mechanics, structural optimization, instability phenomena in thin two-dimensional structures, flexible barriers against debris flows, fatigue safety in the multiaxial regime, behavior of structural elements containing defect. The overall scientific production has been assessed 5/6.

The candidate is/has been member of the Editorial boards of Thin-Walled Structures, Computers, Materials & Continua, Discover Materials, Materials Plus, Applied Mechanics, International Journal of Fatigue, J. of Materials Science and Applications, Journal of Engineering, Modeling and Numerical Simulation of Material Science (MNSMS), The Scientific World Journal, ARPN Journal of Engineering and Applied Sciences. He is Associate Editor of "Computational Materials Science" (specialty of Frontiers in Materials) and Editor-in-Chief of "Journal of Civil Engineering Research. He has been Guest Editor of several special issues, Co-chairman of international conferences, and Member of the scientific committee of many conferences. These activities of scientific animation have been assessed 4/5.

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

The candidate has been teacher in around 70 academic courses, starting from the academic year 1997/1998. He is/was the supervisor of 8 PhD theses. He is member of a number of local committees at the Univ. of Parma, among which: President of the council of the undergraduate degree course in Costruzioni, Infrastrutture e Territorio; Vice-coordinator of the Doctoral programme in Civil Eng. & Architecture. He has been Member of the board of professors of the Doctorate in Meccanica delle strutture, Univ. of Bologna, 2001-2009, and Member of the board of professors of the Doctorate in Ingegneria Civile e Architettura, Univ. of Parma, since 2010.

Overall, the teaching activity of the candidate and his involvement in management pertaining to the teaching activities, is excellent.

SCIENTIFIC RESPONSIBILITY FOR FUNDED RESEARCH PROJECTS:

The candidate was/is scientific responsible of a research unit in the projects: local Co-responsible for Parma Univ. of the European project H2020-WIDESPREAD-2018-03 "Structural Integrity and Reliability of Advanced Materials obtained through additive Manufacturing" – SIRAMM, 2019-2023; call "attività base di ricerca del MIUR", 2017 grant; PI of the scientific research project in cooperation with Univ. di Opole (Polonia) "Development and optimisation of a joint connection system for precast coating panels with high thermal insulation properties", funded within the Accordo-quadro Ministero Commercio estero – ICE – Conferenza dei Rettori delle Università Italiane (CRUI) framework, 2009. The candidate has benn/is also involved in the following projects with private companies: scientific responsible for the research contract with Edilmatic srl, "Development of algorithms for the analysis of the thermal behavior of prefabricated panels with thermal break, numerical and experimental analyses on connection devices for reinforced concrete precast panels" (2019-2021); Scientific co-responsible for the research contract with Incofil Tech srl "Protection systems against natural phenomena: rockfall barriers, weatherproof barriers and umbrella-like snow stop structures" (2016-2019); Scientific responsible for the research contract with FI.MA. srl "Structural analysis under static and dynamic conditions and optimization under seismic and aerodynamic loads of light weight metal structures in steel and aluminum alloys" (2012-2016); scientific responsible for the research contract SMEG SpA "Study of the sealing system for gas under pressure of pipe-valve mechanical joints in different operating conditions" (2017); scientific responsible for the research contract with SMEG SpA, "Structural analysis of seismic improvement interventions of industrial buildings with prefabricated structures", (2013); scientific responsible for the research contract with Edilmatic srl, "Study and analysis of structural elements for the prefabrication industry", (2012); scientific responsible for the research contract with Evifill srl, "Study of the dynamic behavior and optimization of the translating welding head of a single-dose packaging machine for the pharmaceutical industry" (2006-2007).
Overall, the involvement in research projects is excellent, as well as the amount of funding granted.

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

No spin-offs nor patents are reported. Technology transfer has been however promoted through the numerous projects with private companies

SCRUTINY OF THE DEGREE OF KNOWLEDGE OF THE ENGLISH LANGUAGE:

Based on the English language used in the candidate's publication, it can be inferred that the candidate has a very good knowledge of this language.

CANDIDATE: Fedele Roberto

CURRICULUM:
The candidate received an M.S. degree (cum laude) in civil engineering in 1999, and a Ph.D. degree in structural engineering in 2003. He is currently Associate Professor at the Department of Civil and Environmental Engineering of Politecnico di Milano. He was a visiting researcher and professor at Cachan LMT (2007, 2008, 2010 and 2011), invited researcher at the Center for High-Temperature Studies at Foundry Research Institute in Krakow (2016), guest researcher at the Laboratory for high performance Ceramics, Swiss Federal Laboratories for Materials Science and Technology (EMPA, 2017), guest researcher at the Research Laboratory in Hydrodynamics, Energetics & Atmospheric Environment (LHEEA), Ecole Central de Nantes (2017-2018).

Also based on the scientific, didactic, funded research and technology transfer activities commented in what follows, the Selection Board expresses a very positive evaluation on the candidate curriculum.

SUBMITTED PUBLICATIONS:

No. of publications	Type/Title of Publication	Judgment
1	Article/Piola's approach to the equilibrium problem for bodies with second gradient energies. Part I: First gradient theory and differential geometry	0.78
2	Article/Approach à la Piola for the equilibrium problem of bodies with second gradient energies. Part II: Variational derivation of second gradient equations and their transport	0.78
3	Article/Third-gradient continua: nonstandard equilibrium equations and selection of work conjugate variables	0.59
4	Article/Deformation-induced coupling of the generalized external actions in third-gradient materials	0.59
5	Article/Analysis, Design and Realization of a Furnace for In Situ Wettability Experiments at High Temperatures under X-ray Microtomography	0.36
6	Article/Computational prediction of strain-dependent diffusion of transcription factors through the cell nucleus	0.74
7	Article/Fast and reliable non-linear heterogeneous FE approach for the analysis of FRP-reinforced masonry arches	0.74
8	Article/Simultaneous Assessment of Mechanical Properties and Boundary Conditions Based on Digital Image Correlation	0.68
9	Article/Delamination tests on CFRP-reinforced masonry pillars: Optical monitoring and mechanical modeling	0.70
10	Article/Assessment of curved FRP-reinforced masonry prisms: Experiments and modeling	0.81
11	Article/Characterization of innovative CFC/Cu joints by full-field measurements and finite elements	0.51
12	Article/Global 2D digital image correlation for motion estimation in a finite element framework: a variational formulation and a regularized, pyramidal, multi-grid implementation	0.74
13	Article/A Regularized, Pyramidal Multi-grid Approach to Global 3D-Volume Digital Image Correlation Based on X-ray Micro-tomography	0.46
14	Article/Experimental and theoretical issues in FRP-concrete bonding	0.65
15	Article/Three-dimensional effects induced by FRP-from-masonry delamination	0.76
16	Article/Characterization of a cohesive-zone model describing damage and de-cohesion at bonded interfaces. Sensitivity analysis and mode-I parameter identification	0.76
17	Article/Identification of adhesive properties in GLARE assemblies using digital image correlation	0.72
18	Article/A chemo-thermo-damage model for the analysis of concrete dams affected by alkali-silica reaction	0.83
19	Article/Flat-jack tests and inverse analysis for the identification of stress states and elastic properties in concrete dams	0.57
20	Article/Stochastic calibration of local constitutive models through measurements at the macroscale in heterogeneous media	0.56
21	Article/Health assessment of concrete dams by overall inverse analyses and neural networks	0.65

22	Article/Constitutive model calibration for railway wheel steel through tension–torsion tests	0.56
23	Article/Identification of elastic stiffness and local stresses in concrete dams by in situ tests and neural networks	0.37
24	Article/Parameter identification of a cohesive crack model by Kalman filter	0.74
	TOTAL (rounded to first decimal place)	15.6

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 24 submitted publications have been ranked in the table above, with a maximum score of 1 for each publication. The scores have been proposed by taking into account the scientific level of the publication, its relevance for the scientific sector of this selection procedure, criteria and parameters recognised by the relevant international scientific community. The overall score confirms the high quality of the candidate's research. The variety of the topics addressed in the publications presented is very good, as well as the scientific rigor and the innovative character. The personal contribution of the candidate emerges as original and can be easily identified. Thus, the Selection Board evaluates as very good the scientific papers presented by the candidate

The candidate is author/co-author of 131 publications, of which 33 have appeared in scientific journals having a significant impact factor. Based on the database Scopus, the candidate reports an h-index equal to 20 and an overall number of citations of 1039. The candidate's scientific production is very good, with a discontinuity in time. The research activity has been mainly focused on themes of higher-order gradient elastic materials from the standpoint of continuum mechanics, computational strategies for Digital Image Correlation (DIC) and its applications in material mechanics at different scales, experimental characterization and mechanical modelling of FRP-reinforced masonry and concrete elements, strategies for Finite Element Model Updating, design of non conventional mechanical tests, modelling of cohesive fracture and debonding processes, chemical-physical deterioration of concrete structures, Diagnosis and monitoring of existing dams, homogenization of periodic media, mechanical response of railway wheels for high speed trains, application of computational and experimental methodologies to industrial bioengineering. The overall scientific production has been assessed 4/6.

The candidate is member of the Editorial board of Mathematical Problems in Engineering and of Advances in Civil Engineering. He was the co-organizer of 9 minisymposia in national and international conferences. He delivered several invited seminars and spent frequent research periods in foreign institutions. These activities of scientific animation have been assessed 4/5.

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

The candidate presents the detailed activity for the period 2016-2022, as representative of the entire teaching activity. In that period, he has been teacher in around 20 academic courses. He was the main teacher of 5 doctoral courses. He was the co-supervisor of 1 PhD thesis. He is member of the academic board for the PhD programme in Structural, Seismic and Geotechnical Engineering, Politecnico di Milano.
Overall, the teaching activity of the candidate and his involvement in management pertaining to the teaching activities, is very good.

SCIENTIFIC RESPONSIBILITY FOR FUNDED RESEARCH PROJECTS:

The candidate is scientific responsible of Project funded by INPS for a 3 year PhD position in 2021-22. He was principal investigator of the 18-month project (2016- 2018) "BridgedJoint", funded by Regione Lombardia and Cariplo Foundation and reserved to ERC finalists achieving a high score ("B") after panel interview. He was Principal Investigator of a biennal Project granted by Fondazione Cariplo on innovative materials (2011- 2013): "Innovative joints between metals and ceramics for high and ultra high temperature applications (UHT)"; Local Coordinator of a Research Unit in PRIN '07; Principal Investigator of a project, granted by Fondazione Banca del Monte di Lombardia (2011); Coordinator of a Research Group within a MISE-ICE-CRUI project. The candidate is also scientific responsible of the following projects

with private companies: design of a specific mechanical test on structural pin (Faro s.r.l); design and structural assessment of a biomedical equipment (Altalab s.r.l).
Overall, the involvement in research projects is very good, with a good amount of funding granted.

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

No spin-offs nor patents are reported. Technology transfer has been however promoted through the numerous funded projects

SCRUTINY OF THE DEGREE OF KNOWLEDGE OF THE ENGLISH LANGUAGE:

Based on the English language used in the candidate's publication, it can be inferred that the candidate has a very good knowledge of this language.

CANDIDATE: Mariani Stefano

CURRICULUM:
The candidate received an M.S. degree (cum laude) in civil engineering in 1995, and a Ph.D. degree in structural engineering in 1999. He is currently Associate Professor at the Department of Civil and Environmental Engineering of Politecnico di Milano. He was a research scholar at the Danish Technical University (1997), an adjunct professor at Penn State University (2007), and a visiting professor at the Polytechnic Institute of New York University (2009). He has been a recipient of the Associazione Carlo Maddalena Prize for graduate students (1996), and of the Fondazione Confalonieri Prize for PhD students (2000).
Also based on the scientific, didactic, funded research and technology transfer activities commented in what follows, the Selection Board expresses an extremely positive evaluation on the candidate curriculum.

SUBMITTED PUBLICATIONS:

No. of publications	Type/Title of Publication	Judgment
1	Article/Extended finite element method for quasi-brittle fracture	0.95
2	Article/Parameter identification in explicit structural dynamics: performance of the extended Kalman filter	0.95
3	Article/Unscented Kalman filtering for nonlinear structural dynamics	0.95
4	Article/Impact induced composite delamination: state and parameter identification via joint and dual extended Kalman filters	0.95
5	Article/Extended finite element simulation of quasi-brittle fracture in functionally graded materials	0.67
6	Article/Multi-scale Analysis of MEMS Sensors Subject to Drop Impacts	0.63
7	Article/Big Data Analytics and Structural Health Monitoring: A Statistical Pattern Recognition-Based Approach	0.90
8	Article/Model Order Reduction and domain decomposition strategies for the solution of the dynamic elastic–plastic structural problem	0.74
9	Article/Numerical analysis of rate-dependent dynamic composite delamination	0.83

10	Article/Investigation of computational and accuracy issues in POD-based reduced order modeling of dynamic structural systems	0.86
11	Article/Multi-scale analysis of polysilicon MEMS sensors subject to accidental drops: Effect of packaging	0.50
12	Article/Parameter identification of a time-dependent elastic-damage interface model for the simulation of debonding in composites	0.95
13	Article/Parallelized sigma-point Kalman filtering for structural dynamics	0.83
14	Article/Polysilicon MEMS accelerometers exposed to shocks: numerical–experimental investigation	0.49
15	Article/Fast unsupervised learning methods for structural health monitoring with large vibration data from dense sensor networks	0.93
16	Article/Online damage detection in structural systems via dynamic inverse analysis: A recursive Bayesian approach	0.95
17	Article/Optimization of sensor placement to detect damage in flexible plates	0.67
18	Article/Cost–Benefit Optimization of Structural Health Monitoring Sensor Networks	0.83
19	Article/Domain decomposition and model order reduction methods applied to the simulation of multi-physics problems in MEMS	0.65
20	Article/Monte carlo simulation of micro-cracking in polysilicon MEMS exposed to shocks	0.70
21	Article/Early damage assessment in large-scale structures by innovative statistical pattern recognition methods based on time series modeling and novelty detection	0.93
22	Article/Online damage detection via a synergy of proper orthogonal decomposition and recursive Bayesian filters	0.83
23	Article/Identification of Gurson–Tvergaard material model parameters via Kalman filtering technique. I. Theory	0.74
24	Article/An extended FE strategy for transition from continuum damage to mode I cohesive crack propagation	0.93
	TOTAL (rounded to first decimal place)	19.3

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 24 submitted publications have been ranked in the table above, with a maximum score of 1 for each publication. The scores have been proposed by taking into account the scientific level of the publication, its relevance for the scientific sector of this selection procedure, criteria and parameters recognized by the relevant international scientific community. The overall score confirms the high quality of the candidate's research. The variety of the topics addressed in the publications presented is excellent, as well as the scientific rigor and the innovative character. The personal contribution of the candidate emerges as very original and can be fully identified. Thus, the Selection Board evaluates as very positive the scientific papers presented by the candidate.

The candidate is author/co-author of 288 publications, of which 90 have appeared in scientific journals having a significant impact factor. Based on the database Scopus, the candidate reports an h-index equal to 28 and an overall number of citations of 2281. The candidate's scientific production is very good and remarkably continuous in time. The research activity has been mainly focused on themes of parameter identification, delamination in composite materials, reliability analysis of Micro-Electro-Mechanical-Systems, structural health monitoring, formulation of reduced order models, uncertainty quantification, analysis of the response of athletic surfaces, smart building skins. The overall scientific production has been assessed 6/6.

The candidate is member of the Editorial boards of the following journals: International Journal on Advances in Systems and Measurements, Inventions, Machines, Materials, Micro and Nanosystems, Micromachines, Sci. He is Section Editor-in-Chief of Algorithms, Associate Editor of Frontiers in Materials, and Section Associate Editor of Sensors. Since 2018 he

has been member of the Scientific Committees of 68 International Conferences. Since 2014 he is Co-chairman of the International Electronic Conference on Sensors and Applications (ECSA). He has been guest editor of 20 special issues on International Journals. In 2015, he has been a Founding Member of the Inter-Departmental Politecnico E4Sport - Engineering for Sport Laboratory. He is member of the Scientific Committee of PoliFab, the micro and nano technology center of Politecnico di Milano since 2019 and Member of EuMat Working Group 4 on Nanomaterials for Novel Structural and Functional Applications since 2021. These activities of scientific animation have been assessed 5/5.

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

The candidate has been teacher in around 50 academic courses, starting from the academic year 2004/2005. He carried out teaching activity in PhD courses, as well. He has been/is the supervisor of 13 PhD theses, and Main Tutor of 7 ASP (Alta Scuola Politecnica) multidisciplinary projects. He is member of the academic board for the PhD programme in Structural, Seismic and Geotechnical Engineering, Politecnico di Milano since 2014, and he is currently Head/Coordinator of the Faculty Board of the same Ph.D. Program. He is: Member of the Council of the School of Design of Politecnico di Milano since 2011. He is also member of the Teaching Commission of the Department of Civil and Environmental Engineering of Politecnico di Milano since 2013, and has been member of the Scientific Commission of the same Department (2020-2022).
Overall, the teaching activity of the candidate and his involvement in management pertaining to the teaching activities, is excellent.

SCIENTIFIC RESPONSIBILITY FOR FUNDED RESEARCH PROJECTS:

The candidate is local scientific responsible of the projects: HORIZON-MSCA-2021-DN-01: MIRELAI - MIcroelectronics RELiability driven by Artificial Intelligence (Industrial Doctorate); PNRR (National Recovery and Resilience Plan) to fund a scholarship related to Energy Transition & Environmental Impact; PNRR (National Recovery and Resilience Plan), National Center on High Performance Computing, spoke on Quantum Computing. He has been the PI (project coordinator) of Safer Helmets, a Fondazione Cariplo project related to Scientific and Technological Research on Advanced Materials 2013. The candidate is also scientific responsible of the following projects with private companies: Copper-Resin adhesion: characterization and modelling (with STMicroelectronics); The creation of "digital twin" models for MEMS structures (with Robert Bosch); Smart sensors for microfluidics (within a Joint Research Center with Fluid-o-Tech and STMicroelectronics).
Overall, the involvement in research projects is excellent, as well as the amount of funding granted.

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 co-inventor of 2 patents.

SCRUTINY OF THE DEGREE OF KNOWLEDGE OF THE ENGLISH LANGUAGE:

Based on the English language used in the candidate's publication, it can be inferred that the candidate has a very good knowledge of this language.

CANDIDATE: Placidi Luca

CURRICULUM:

The candidate received a degree (cum laude) in physics in 2001, a M.S. degree in Mechanical Engineering in 2002, a Ph.D. degree in Mechanik in 2004, and another Ph.D. degree in Theoretical and Applied Mechanics in 2006. He is currently Associate Professor at the Faculty of Engineering of the International Telematic University UNINETTUNO. He spent research periods in foreign institutions: at the Low Temperature Institute University (Hokkaido) of Sapporo in Japan (2005); at the Poly Technical University of New York (2007); at the Institut de Mathématiques de Toulon et du Var (2007 and 2015); at the Université Paris-Est Créteil Val de Marnein (2015); at the Laboratoire de Géologie, Ecole normale supérieure (2016).
Also based on the scientific, didactic, funded research and technology transfer activities commented in what follows, the Selection Board expresses a very positive evaluation on the candidate curriculum.

SUBMITTED PUBLICATIONS:

No. of publications	Type/Title of Publication	Judgment
1	Article/On a hemi-variational formulation for a 2D elasto-plastic-damage strain gradient solid with granular microstructure	0.56
2	Article/A block-based variational elasto-damage model for masonry analysis inspired from granular micromechanics: Preliminary study	0.50
3	Article/Hemivariational continuum approach for granular solids with damage-induced anisotropy evolution	0.81
4	Article/Micromechanics-based elasto-plastic–damage energy formulation for strain gradient solids with granular microstructure	0.72
5	Article/Identification of a geometrically nonlinear micromorphic continuum via granular micromechanics	0.72
6	Article/Two-Dimensional Analysis of Size Effects in Strain-Gradient Granular Solids with Damage-Induced Anisotropy Evolution	0.49
7	Article/A damaged non-homogeneous Timoshenko beam model for a dam subjected to aging effects	0.74
8	Article/Granular micromechanics-based identification of isotropic strain gradient parameters for elastic geometrically nonlinear deformations	0.58
9	Article/A novel structural resilience index: definition and applications to frame structures	0.72
10	Article/Pantographic beam: a complete second gradient 1D-continuum in plane	0.50
11	Article/On the validity range of strain-gradient elasticity: A mixed static-dynamic identification procedure	0.93
12	Article/A Strain Gradient Variational Approach To Damage: A Comparison With Damage Gradient Models And Numerical Results	0.83
13	Article/Energy approach to brittle fracture in strain-gradient modelling	0.86
14	Article/Discrete and continuous aspects of some metamaterial elastic structures with band gaps	0.76
15	Article/Identification of two-dimensional pantographic structure via a linear D4 orthotropic second gradient elastic model	0.83
16	Article/A variational approach for a nonlinear one-dimensional damage-elasto-plastic second-gradient continuum model	0.78
17	Article/Gedanken experiments for the determination of two-dimensional linear second gradient elasticity coefficients	0.72
18	Article/At the origins and in the vanguard of peridynamics, non-local and higher-gradient continuum mechanics: An underestimated and still topical contribution of Gabrio Piola	0.93
19	Article/Reflection and transmission of plane waves at surfaces carrying material properties and embedded in second-gradient materials	0.90

20	Article/Microcantilever dynamics in tapping mode atomic force microscopy via higher eigenmodes analysis	0.74
21	Article/Linear plane wave propagation and normal transmission and reflection at discontinuity surfaces in second gradient 3D continua	0.74
22	Article/Application of a continuum-mechanical model for the flow of anisotropic polar ice to the EDML core, Antarctica	0.56
23	Article/A mixture theory framework for modeling the mechanical actuation of ionic polymer metal composites	0.83
24	Article/Thermodynamics of polycrystalline materials treated by the theory of mixtures with continuous diversity	0.67
	TOTAL (rounded to first decimal place)	17.4

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 24 submitted publications have been ranked in the table above, with a maximum score of 1 for each publication. The scores have been proposed by taking into account the scientific level of the publication, its relevance for the scientific sector of this selection procedure, criteria and parameters recognised by the relevant international scientific community. The overall score confirms the high quality of the candidate's research. The variety of the topics addressed in the publications presented is good, with a very good scientific rigor and innovative character. The personal contribution of the candidate emerges as original and can be easily identified. Thus, the Selection Board evaluates as very good the scientific papers presented by the candidate.

The candidate is author/co-author of 206 publications, of which 90 have appeared in scientific journals having a significant impact factor. Based on the database Scopus, the candidate reports an h-index equal to 36 and an overall number of citations of 3690. The candidate's scientific production is very good and remarkably continuous in time. The research activity has been mainly focused on themes of micro-structured continua, granular micromechanics, variational approaches, second gradient and micromorphic continua, anisotropic constitutive laws, fatigue and aging, resilience, robust and compartmentalized structures, propagation of bulk waves and dispersion relation, theory of mixtures, fluid saturated porous media, ionic polymer metal composite, polycrystalline materials. The overall scientific production has been assessed 6/6.

The candidate is member of the Editorial board of Nanomechanics Science and Technology: An International Journal, Vestnik of Tomsk State University of Architecture and Building, Continuum Mechanics and thermodynamics, BMC Mechanical Engineering. He was member of the Scientific Committee of the EUROMECH-Colloquium 579, member of the Scientific committee of the International research center "Mathematics and Mechanics Of Complex Systems" (M&MOCS). These activities of scientific animation have been assessed 4/5.

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

The candidate has been teacher in around 40 academic courses at UniNettuno, starting from the academic year 2013/2014; he has been also tutor for a large number of other courses, spanning from Scienza delle Costruzioni (Structural Mechanics), to Tecnica delle Costruzioni (Structural Engineering), Geologia geodesia e geotecnica, Ingegneria delle gallerie e delle fondazioni. He carried out teaching activity in PhD courses, as well. He was the supervisor of 2 PhD theses. He was member of the academic board for the PhD programme in Mathematics and models, of the University of L'Aquila (2017-2022), and since 2022 he is member of the council of the Doctoral School in Ingegneria dell'innovazione tecnologica of the International Telematic University Uninettuno, and Member of the council of the National Doctoral School in "Defense against natural risks and ecological transition of built environment" of the Università degli Studi di Catania.
Overall, the teaching activity of the candidate and his involvement in management pertaining to the teaching activities, is good.

SCIENTIFIC RESPONSIBILITY FOR FUNDED RESEARCH PROJECTS:

The candidate was scientific responsible of the project "Effetti della caduta massi su costruzioni e infrastrutture civili e industriali" funded by Regione Valle D'Aosta; scientific co-responsible of two projects taken by CNRS International Associate Laboratory Coss&Vita; scientific responsible of the project "AI4BS", POR FESR LAZIO – AVVISO BIOEDILIZIA E SMART BUILDING; scientific responsible of the project "Modellazioni analitiche del degrado".
Overall, the involvement in research projects is sufficient, as well as the amount of funding granted.

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 reports 1 patent filed and no participations in spin-offs.

SCRUTINY OF THE DEGREE OF KNOWLEDGE OF THE ENGLISH LANGUAGE:

Based on the English language used in the candidate's publication, it can be inferred that the candidate has a very good knowledge of this language.

THE SELECTION BOARD

Prof. MOËS Nicolas *(Chairman)*

Prof. MOLINARI Jean-François *(Member)*

Prof. FRANGI Attilio Alberto *(Secretary)*

Nicolas MOËS Digitally signed by Nicolas MOËS Date: 2023.03.06 15:49:38 +01'00'

9/3/2023

POLITECNICO MILANO 1863

PUBLIC SELECTION ESTABLISHED WITH DIRECTOR'S DECREE NO. 2022_PRO_DICA_2 OF 29/09/2022 PURSUANT TO THE NOTICE PUBLISHED IN THE OFFICIAL GAZETTE NO. 21/10/2022, n. 84 FOR 1 POSITION AS FULL PROFESSOR FOR THE COMPETITION SECTOR 08/B2 - STRUCTURAL MECHANICS - SDS ICAR/08 - STRUCTURAL MECHANICS, PURSUANT TO ART. 18 - LAW 240/2010, AT THE POLITECNICO DI MILANO - DEPARTMENT OF CIVIL AND ENVIRONMENTAL ENGINEERING (PROCEDURE CODE 2022_PRO_DICA_2).

ATTACHMENT No. 2 to the FINAL REPORT

MERIT RANKING

SURNAME AND NAME	Overall score
Mariani Stefano	82.3
Ardito Raffaele	80.6
Brighenti Roberto	76.3
Fedele Roberto	67.6
Placidi Luca	66.4

Milan, 22/02/2023

THE SELECTION BOARD

Prof. MOËS Nicolas *(Chairman)*

Prof. MOLINARI Jean-François *(Member)*

Prof. FRANGI Attilio Alberto *(Secretary)*

Nicolas MOËS Digitally signed by Nicolas MOËS Date: 2023.03.06 15:49:59 +01'00'

9/3/2023

POLITECNICO MILANO 1863

PUBLIC SELECTION ESTABLISHED WITH DIRECTOR'S DECREE NO. 2022_PRO_DICA_2 OF 29/09/2022 PURSUANT TO THE NOTICE PUBLISHED IN THE OFFICIAL GAZETTE NO. 21/10/2022, n. 84 FOR 1 POSITION AS FULL PROFESSOR FOR THE COMPETITION SECTOR 08/B2 - STRUCTURAL MECHANICS - SDS ICAR/08 - STRUCTURAL MECHANICS, PURSUANT TO ART. 18 - LAW 240/2010, AT THE POLITECNICO DI MILANO - DEPARTMENT OF CIVIL AND ENVIRONMENTAL ENGINEERING (PROCEDURE CODE 2022_PRO_DICA_2).

FINAL REPORT

The Selection Board, appointed with RD Index No. 12263 ref. No. 270610 of 23 November 2022, composed by the following Professors:

Prof. FRANGI Attilio Alberto - Politecnico di Milano;
Prof. MOLINARI Jean-François - Ecole Polytechnique Fédérale de Lausanne (EPFL);
Prof. MOËS Nicolas - École Centrale de Nantes,

met on January 18th at 17h, 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:

Prof. MOËS Nicolas, Ecole Centrale de Nantes, Chairman;
Prof. FRANGI Attilio Alberto, at 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 February 8th at 16h, the Selection Board met for the second teleconference meeting to inspect the list of applicants, who were:

1) Ardito Raffaele
2) Brighenti Roberto
3) Fedele Roberto
4) Mariani Stefano

5) Placidi Luca

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.
The Selection Board started to examine the documentation submitted by the candidates.

On February 22th at 16h, the Selection Board met for the third teleconference meeting.
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. MOËS Nicolas *(Chairman)* Nicolas MOËS

Prof. MOLINARI Jean-François *(Member)* _____

Prof. FRANGI Attilio Alberto *(Secretary)* _____

POLITECNICO MILANO 1863

PUBLIC SELECTION ESTABLISHED WITH DIRECTOR'S DECREE NO. 2022_PRO_DICA_2 OF 29/09/2022 PURSUANT TO THE NOTICE PUBLISHED IN THE OFFICIAL GAZETTE NO. 21/10/2022, n. 84 FOR 1 POSITION AS FULL PROFESSOR FOR THE COMPETITION SECTOR 08/B2 - STRUCTURAL MECHANICS - SDS ICAR/08 - STRUCTURAL MECHANICS, PURSUANT TO ART. 18 - LAW 240/2010, AT THE POLITECNICO DI MILANO - DEPARTMENT OF CIVIL AND ENVIRONMENTAL ENGINEERING (PROCEDURE CODE 2022_PRO_DICA_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
Ardito Raffaele	23.6	30	13	14	80.6
Brighenti Roberto	27.3	34	13	2	76.3
Fedele Roberto	23.6	30	12	2	67.6
Mariani Stefano	30.3	34	13	5	82.3
Placidi Luca	27.4	30	6	3	66.4

CANDIDATE: Ardito Raffaele

CURRICULUM:
The candidate received an M.S. degree (cum laude) in civil engineering in 2000, and a Ph.D. degree in structural engineering in 2004. He is currently Associate Professor at the Department of Civil and Environmental Engineering of Politecnico di Milano. He was a visiting scientist at Lawrence Berkeley National Laboratory, Berkeley (2006), and at the Massachusetts Institute of Technology, Research Laboratory of Electronics (2008 and 2010). He has been a recipient of the Associazione Carlo Maddalena Prize for graduate students (2000), and of a research fund for your researchers provided by Department of Structural Engineering of Politecnico di Milano (2009).
Also based on the scientific, didactic, funded research and technology transfer activities commented in what follows, the Selection Board expresses a very positive evaluation on the candidate curriculum.

SUBMITTED PUBLICATIONS:

No. of publications	Type/Title of Publication	Judgment
1	Article/Numerical and experimental evaluation of the magnetic interaction for frequency up-conversion in piezoelectric vibration energy harvesters	0.65
2	Article/Selective Mode Conversion and Rainbow Trapping via Graded Elastic Waveguides	0.54
3	Article/3D printing of fine alumina powders by binder jetting	0.54
4	Article/Experimental investigation of amplification, via a mechanical delay-line, in a rainbow-based metamaterial for energy harvesting	0.59
5	Article/A design strategy to match the band gap of periodic and aperiodic metamaterials	0.56
6	Article/Graded elastic metasurface for enhanced energy harvesting	0.68
7	Article/3-D design and simulation of a piezoelectric micropump	0.56
8	Article/Low frequency 3D ultra-wide vibration attenuation via elastic metamaterial	0.72
9	Article/Band-gap structure in two- and three-dimensional cellular locally resonant materials	0.72
10	Book/Mechanics of Microsystems	0.60
11	Article/3D auxetic single material periodic structure with ultra-wide tunable bandgap	0.65
12	Article/Stability of dynamic response of suspension bridges	0.83
13	Article/Mechanical low-frequency filter via modes separation in 3D periodic structures	0.63
14	Article/Electro-mechanical modelling and experimental characterization of a high-aspect-ratio electrostatic-capacitive MEMS device	0.45
15	Article/Shape optimization of solid–air porous phononic crystal slabs with widest full 3D bandgap for in-plane acoustic waves	0.70
16	Article/Modeling and experimental verification of an ultra-wide bandgap in 3D phononic crystal	0.70
17	Article/Improved one-dimensional model of piezoelectric laminates for energy harvesters including three dimensional effects	0.74
18	Article/Advanced models for the calculation of capillary attraction in axisymmetric configurations	0.63
19	Article/On the application of piezolaminated composites to diaphragm micropumps	0.72
20	Article/Modelling of spontaneous adhesion phenomena in micro-electro-mechanical systems	0.74
21	Article/A plate model for the evaluation of pull-in instability occurrence in electrostatic micropump diaphragms	0.63
22	Article/Diagnostic analysis of concrete dams based on seasonal hydrostatic loading	0.74
23	Article/Solid damping in micro electro mechanical systems	0.63
24	Article/On structural safety assessment by load factor maximization in piecewise linear plasticity	0.65
	TOTAL (rounded to first decimal place)	15.6

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 24 submitted publications have been ranked in the table above, with a maximum score of 1 for each publication. The scores have been proposed by taking into account the scientific level of the publication, its relevance for the scientific sector of this selection procedure, criteria and parameters recognised by the relevant international scientific community. The overall score confirms the high quality of the candidate's research. The variety of the topics addressed in the publications presented is excellent, as well as the scientific rigor and the innovative character. The personal contribution of the candidate emerges as original and significant. Thus, the Selection Board evaluates as very good the scientific papers presented by the candidate.

The candidate is author/co-author of 162 publications, of which 70 have appeared in scientific journals having a significant impact factor. Based on the database Scopus, the candidate reports an h-index equal to 22 and an overall number of citations of 1661. The candidate's scientific production is very good and remarkably continuous in time. The research activity has been mainly focused on themes of advanced functional materials, metamaterials, micro-mechanics with application to Micro-Electro-Mechanical-Systems and Nano-Electro-Mechanical-Systems, linear and nonlinear dynamics of solids and structures, mechanics of solids and structures in cryogenic conditions, inverse analysis, direct methods for limit and shakedown analyses. The overall scientific production has been assessed 5/6.

The candidate is member of the Editorial board of the European Journal of Mechanics – A/Solids. He was member of the Editorial Board in several editions of the "CST - International Conference on Computational Structures Technology". He has been guest editor for the special issue "Advanced Locally Resonant Materials", on the journal Materials. These activities of scientific animation have been assessed 3/5.

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

The candidate has been teacher in over 40 academic courses, starting from the academic year 2004/2005. He carried out teaching activity in PhD courses, as well. He has been teaching assistant in several courses, starting from the academic year 2000/2001. He has been the supervisor of 8 PhD theses. He is member of the academic board for the PhD programme in Structural, Seismic and Geotechnical Engineering, Politecnico di Milano and deputy coordinator of the Commission for the final exam of the Master of Science in Civil Engineering, Politecnico di Milano.
Overall, the teaching activity of the candidate and his involvement in management pertaining to the teaching activities, is very good.

SCIENTIFIC RESPONSIBILITY FOR FUNDED RESEARCH PROJECTS:

The candidate is scientific responsible of a research unit in the FET-proactive project MetaVEH – Metamaterials Enhanced Vibration Energy Harvesting, funded by the EU. The candidate is scientific responsible of FUNTASMA – Functional Sintered Materials - interdisciplinary laboratory founded in 2017 and financed by Politecnico di Milano. The candidate is also scientific responsible of the following project with a private company: research line P6 – SOW16, Metamaterials and metastructures for mechanical energy management in MEMS. "Energy-MEMS", within the Research Center on Sensor Systems with Advanced Materials (STEAM Joint Research Center Politecnico di Milano- ST Microelectronics).
Overall, the involvement in research projects is very good, as well as the amount of funding granted.

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 co-inventor of 9 patents, 5 of them national and the remaining 4 international. Moreover, the candidate is the co-founder of a spin-off of Politecnico di Milano, the company Phononic Vibes S.r.l.

SCRUTINY OF THE DEGREE OF KNOWLEDGE OF THE ENGLISH LANGUAGE:

Based on the English language used in the candidate's publication, it can be inferred that the candidate has a very good knowledge of this language.

CANDIDATE: Brighenti Roberto

CURRICULUM:

The candidate received an M.S. degree (cum laude) in civil engineering in 1993, and a Ph.D. degree in mechanics of structures in 1997. He is currently Associate Professor at the Department of Civil-Environmental Engineering & Architecture, University of Parma. He was a visiting scientist at the Laboratoire de Fiabilitè Mecanique, Facultè de Science, Univ. di Metz (1995), at the Department of Mechanical and Process Engineering, Univ. di Sheffield (1995), at Dept. of Construction and Manufacturing Engineering, University of Oviedo, Gijón (2013), at Dept. of Mechanical Engineering, Colorado Univ. at Boulder (2016, 2018), Dept. of Mechanical Engineering, Dortmund Technical Univ. (2017), Institute of Structural Mechanics, Faculty of Civil Eng., Bauhaus Univ. Weimar (2019), Institute of Structural Mechanics, California Institute of Technology (2020).

Also based on the scientific, didactic, funded research and technology transfer activities commented in what follows, the Selection Board expresses a fully positive evaluation on the candidate curriculum.

SUBMITTED PUBLICATIONS:

No. of publications	Type/Title of Publication	Judgment
1	Article/Mechanics of multi-stimuli temperature-responsive hydrogels	0.86
2	Article/Multiphysics modelling of the mechanical properties in polymers obtained via photo-induced polymerization	0.61
3	Article/Mechanical behavior of photopolymerized materials	0.95
4	Article/A micromechanical-based model of stimulus responsive liquid crystal elastomers	0.85
5	Article/Phase field approach for simulating failure of viscoelastic elastomers	0.74
6	Article/Swelling mechanism in smart polymers responsive to mechano-chemical stimuli	0.95
7	Article/Cutting resistance of soft materials: Effects of blade inclination and friction	0.81
8	Article/Mechanics of materials with embedded unstable molecules	0.83
9	Article/The fracture mechanics in cutting: A comparative study on hard and soft polymeric materials	0.63
10	Article/Statistical Damage Mechanics of Polymer Networks	0.90
11	Article/Mechanics of responsive polymers via conformationally switchable molecules	0.74
12	Article/Strain field self-diagnostic PDMS elastomers	0.58
13	Article/A statistically-based continuum theory for polymers with transient networks	0.93
14	Article/Dynamic behaviour of solids and granular materials: a force potential-based particle method	0.76
15	Article/A novel finite element formulation for beams with composite cross-section	0.67
16	Article/Optimal fiber content and distribution in fiber-reinforced solids using a reliability and NURBS based sequential optimization approach	0.79

17	Article/Optimization of fiber distribution in fiber reinforced composite by using NURBS functions	0.61
18	Article/A micro-mechanical model for statistically unidirectional and randomly distributed fibre-reinforced solids	0.67
19	Article/A new discontinuous FE formulation for crack path prediction in brittle solids	0.68
20	Article/Application of the element-free Galerkin meshless method to 3-D fracture mechanics problems	0.88
21	Article/A physics-based micromechanical model for electroactive viscoelastic polymers	0.65
22	Article/Rate-dependent failure mechanism of elastomers	0.74
23	Article/Laser-based additively manufactured polymers: a review on processes and mechanical models	0.70
24	Article/Controlled morphing of architected liquid crystal elastomer elements: modeling and simulations	0.76
	TOTAL (rounded to first decimal place)	18.3

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 24 submitted publications have been ranked in the table above, with a maximum score of 1 for each publication. The scores have been proposed by taking into account the scientific level of the publication, its relevance for the scientific sector of this selection procedure, criteria and parameters recognised by the relevant international scientific community The overall score confirms the high quality of the candidate's research. The variety of the topics addressed in the publications presented is very good, as well as the scientific rigor and the innovative character. The personal contribution of the candidate emerges as very original and can be very easily identified. Thus, the Selection Board evaluates as excellent the scientific papers presented by the candidate.

The candidate is author/co-author of 236 publications, of which 128 have appeared in scientific journals having a significant impact factor. Based on the database Scopus, the candidate reports an h-index equal to 31 and an overall number of citations of 2510. The candidate's scientific production is excellent and remarkably continuous in time. The research activity has been mainly focused on themes of mechanical models for the study of responsive materials, development of discrete element models, composite materials, computational approaches to fracture mechanics, structural optimization, instability phenomena in thin two-dimensional structures, flexible barriers against debris flows, fatigue safety in the multiaxial regime, behavior of structural elements containing defect. The overall scientific production has been assessed 5/6.

The candidate is/has been member of the Editorial boards of Thin-Walled Structures, Computers, Materials & Continua, Discover Materials, Materials Plus, Applied Mechanics, International Journal of Fatigue, J. of Materials Science and Applications, Journal of Engineering, Modeling and Numerical Simulation of Material Science (MNSMS), The Scientific World Journal, ARPN Journal of Engineering and Applied Sciences. He is Associate Editor of "Computational Materials Science" (specialty of Frontiers in Materials) and Editor-in-Chief of "Journal of Civil Engineering Research. He has been Guest Editor of several special issues, Co-chairman of international conferences, and Member of the scientific committee of many conferences. These activities of scientific animation have been assessed 4/5.

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

The candidate has been teacher in around 70 academic courses, starting from the academic year 1997/1998. He is/was the supervisor of 8 PhD theses. He is member of a number of local committees at the Univ. of Parma, among which: President of the council of the undergraduate degree course in Costruzioni, Infrastrutture e Territorio; Vice-coordinator of the Doctoral programme in Civil Eng. & Architecture. He has been Member of the board of professors of the Doctorate in Meccanica delle strutture, Univ. of Bologna, 2001-2009, and Member of the board of professors of the Doctorate in Ingegneria Civile e Architettura, Univ. of Parma, since 2010.

Overall, the teaching activity of the candidate and his involvement in management pertaining to the teaching activities, is excellent.

SCIENTIFIC RESPONSIBILITY FOR FUNDED RESEARCH PROJECTS:

The candidate was/is scientific responsible of a research unit in the projects: local Co-responsible for Parma Univ. of the European project H2020-WIDESPREAD-2018-03 "Structural Integrity and Reliability of Advanced Materials obtained through additive Manufacturing" – SIRAMM, 2019-2023; call "attività base di ricerca del MIUR", 2017 grant; PI of the scientific research project in cooperation with Univ. di Opole (Polonia) "Development and optimisation of a joint connection system for precast coating panels with high thermal insulation properties", funded within the Accordo-quadro Ministero Commercio estero – ICE – Conferenza dei Rettori delle Università Italiane (CRUI) framework, 2009. The candidate has benn/is also involved in the following projects with private companies: scientific responsible for the research contract with Edilmatic srl, "Development of algorithms for the analysis of the thermal behavior of prefabricated panels with thermal break, numerical and experimental analyses on connection devices for reinforced concrete precast panels" (2019-2021); Scientific co-responsible for the research contract with Incofil Tech srl "Protection systems against natural phenomena: rockfall barriers, weatherproof barriers and umbrella-like snow stop structures" (2016-2019); Scientific responsible for the research contract with FI.MA. srl "Structural analysis under static and dynamic conditions and optimization under seismic and aerodynamic loads of light weight metal structures in steel and aluminum alloys" (2012-2016); scientific responsible for the research contract SMEG SpA "Study of the sealing system for gas under pressure of pipe-valve mechanical joints in different operating conditions" (2017); scientific responsible for the research contract with SMEG SpA, "Structural analysis of seismic improvement interventions of industrial buildings with prefabricated structures", (2013); scientific responsible for the research contract with Edilmatic srl, "Study and analysis of structural elements for the prefabrication industry", (2012); scientific responsible for the research contract with Evifill srl, "Study of the dynamic behavior and optimization of the translating welding head of a single-dose packaging machine for the pharmaceutical industry" (2006-2007).
Overall, the involvement in research projects is excellent, as well as the amount of funding granted.

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

No spin-offs nor patents are reported. Technology transfer has been however promoted through the numerous projects with private companies

SCRUTINY OF THE DEGREE OF KNOWLEDGE OF THE ENGLISH LANGUAGE:

Based on the English language used in the candidate's publication, it can be inferred that the candidate has a very good knowledge of this language.

CANDIDATE: Fedele Roberto

CURRICULUM:
The candidate received an M.S. degree (cum laude) in civil engineering in 1999, and a Ph.D. degree in structural engineering in 2003. He is currently Associate Professor at the Department of Civil and Environmental Engineering of Politecnico di Milano. He was a visiting researcher and professor at Cachan LMT (2007, 2008, 2010 and 2011), invited researcher at the Center for High-Temperature Studies at Foundry Research Institute in Krakow (2016), guest researcher at the Laboratory for high performance Ceramics, Swiss Federal Laboratories for Materials Science and Technology (EMPA, 2017), guest researcher at the Research Laboratory in Hydrodynamics, Energetics & Atmospheric Environment (LHEEA), Ecole Central de Nantes (2017-2018).

Also based on the scientific, didactic, funded research and technology transfer activities commented in what follows, the Selection Board expresses a very positive evaluation on the candidate curriculum.

SUBMITTED PUBLICATIONS:

No. of publications	Type/Title of Publication	Judgment
1	Article/Piola's approach to the equilibrium problem for bodies with second gradient energies. Part I: First gradient theory and differential geometry	0.78
2	Article/Approach à la Piola for the equilibrium problem of bodies with second gradient energies. Part II: Variational derivation of second gradient equations and their transport	0.78
3	Article/Third-gradient continua: nonstandard equilibrium equations and selection of work conjugate variables	0.59
4	Article/Deformation-induced coupling of the generalized external actions in third-gradient materials	0.59
5	Article/Analysis, Design and Realization of a Furnace for In Situ Wettability Experiments at High Temperatures under X-ray Microtomography	0.36
6	Article/Computational prediction of strain-dependent diffusion of transcription factors through the cell nucleus	0.74
7	Article/Fast and reliable non-linear heterogeneous FE approach for the analysis of FRP-reinforced masonry arches	0.74
8	Article/Simultaneous Assessment of Mechanical Properties and Boundary Conditions Based on Digital Image Correlation	0.68
9	Article/Delamination tests on CFRP-reinforced masonry pillars: Optical monitoring and mechanical modeling	0.70
10	Article/Assessment of curved FRP-reinforced masonry prisms: Experiments and modeling	0.81
11	Article/Characterization of innovative CFC/Cu joints by full-field measurements and finite elements	0.51
12	Article/Global 2D digital image correlation for motion estimation in a finite element framework: a variational formulation and a regularized, pyramidal, multi-grid implementation	0.74
13	Article/A Regularized, Pyramidal Multi-grid Approach to Global 3D-Volume Digital Image Correlation Based on X-ray Micro-tomography	0.46
14	Article/Experimental and theoretical issues in FRP-concrete bonding	0.65
15	Article/Three-dimensional effects induced by FRP-from-masonry delamination	0.76
16	Article/Characterization of a cohesive-zone model describing damage and de-cohesion at bonded interfaces. Sensitivity analysis and mode-I parameter identification	0.76
17	Article/Identification of adhesive properties in GLARE assemblies using digital image correlation	0.72
18	Article/A chemo-thermo-damage model for the analysis of concrete dams affected by alkali-silica reaction	0.83
19	Article/Flat-jack tests and inverse analysis for the identification of stress states and elastic properties in concrete dams	0.57
20	Article/Stochastic calibration of local constitutive models through measurements at the macroscale in heterogeneous media	0.56
21	Article/Health assessment of concrete dams by overall inverse analyses and neural networks	0.65

22	Article/Constitutive model calibration for railway wheel steel through tension–torsion tests	0.56
23	Article/Identification of elastic stiffness and local stresses in concrete dams by in situ tests and neural networks	0.37
24	Article/Parameter identification of a cohesive crack model by Kalman filter	0.74
	TOTAL (rounded to first decimal place)	15.6

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 24 submitted publications have been ranked in the table above, with a maximum score of 1 for each publication. The scores have been proposed by taking into account the scientific level of the publication, its relevance for the scientific sector of this selection procedure, criteria and parameters recognised by the relevant international scientific community. The overall score confirms the high quality of the candidate's research. The variety of the topics addressed in the publications presented is very good, as well as the scientific rigor and the innovative character. The personal contribution of the candidate emerges as original and can be easily identified. Thus, the Selection Board evaluates as very good the scientific papers presented by the candidate

The candidate is author/co-author of 131 publications, of which 33 have appeared in scientific journals having a significant impact factor. Based on the database Scopus, the candidate reports an h-index equal to 20 and an overall number of citations of 1039. The candidate's scientific production is very good, with a discontinuity in time. The research activity has been mainly focused on themes of higher-order gradient elastic materials from the standpoint of continuum mechanics, computational strategies for Digital Image Correlation (DIC) and its applications in material mechanics at different scales, experimental characterization and mechanical modelling of FRP-reinforced masonry and concrete elements, strategies for Finite Element Model Updating, design of non conventional mechanical tests, modelling of cohesive fracture and debonding processes, chemical-physical deterioration of concrete structures, Diagnosis and monitoring of existing dams, homogenization of periodic media, mechanical response of railway wheels for high speed trains, application of computational and experimental methodologies to industrial bioengineering. The overall scientific production has been assessed 4/6.

The candidate is member of the Editorial board of Mathematical Problems in Engineering and of Advances in Civil Engineering. He was the co-organizer of 9 minisymposia in national and international conferences. He delivered several invited seminars and spent frequent research periods in foreign institutions. These activities of scientific animation have been assessed 4/5.

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

The candidate presents the detailed activity for the period 2016-2022, as representative of the entire teaching activity. In that period, he has been teacher in around 20 academic courses. He was the main teacher of 5 doctoral courses. He was the co-supervisor of 1 PhD thesis. He is member of the academic board for the PhD programme in Structural, Seismic and Geotechnical Engineering, Politecnico di Milano.
Overall, the teaching activity of the candidate and his involvement in management pertaining to the teaching activities, is very good.

SCIENTIFIC RESPONSIBILITY FOR FUNDED RESEARCH PROJECTS:

The candidate is scientific responsible of Project funded by INPS for a 3 year PhD position in 2021-22. He was principal investigator of the 18-month project (2016- 2018) "BridgedJoint", funded by Regione Lombardia and Cariplo Foundation and reserved to ERC finalists achieving a high score ("B") after panel interview. He was Principal Investigator of a biennal Project granted by Fondazione Cariplo on innovative materials (2011- 2013): "Innovative joints between metals and ceramics for high and ultra high temperature applications (UHT)"; Local Coordinator of a Research Unit in PRIN '07; Principal Investigator of a project, granted by Fondazione Banca del Monte di Lombardia (2011); Coordinator of a Research Group within a MISE-ICE-CRUI project. The candidate is also scientific responsible of the following projects

with private companies: design of a specific mechanical test on structural pin (Faro s.r.l); design and structural assessment of a biomedical equipment (Altalab s.r.l).
Overall, the involvement in research projects is very good, with a good amount of funding granted.

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

No spin-offs nor patents are reported. Technology transfer has been however promoted through the numerous funded projects

SCRUTINY OF THE DEGREE OF KNOWLEDGE OF THE ENGLISH LANGUAGE:

Based on the English language used in the candidate's publication, it can be inferred that the candidate has a very good knowledge of this language.

CANDIDATE: Mariani Stefano

CURRICULUM:
The candidate received an M.S. degree (cum laude) in civil engineering in 1995, and a Ph.D. degree in structural engineering in 1999. He is currently Associate Professor at the Department of Civil and Environmental Engineering of Politecnico di Milano. He was a research scholar at the Danish Technical University (1997), an adjunct professor at Penn State University (2007), and a visiting professor at the Polytechnic Institute of New York University (2009). He has been a recipient of the Associazione Carlo Maddalena Prize for graduate students (1996), and of the Fondazione Confalonieri Prize for PhD students (2000).
Also based on the scientific, didactic, funded research and technology transfer activities commented in what follows, the Selection Board expresses an extremely positive evaluation on the candidate curriculum.

SUBMITTED PUBLICATIONS:

No. of publications	Type/Title of Publication	Judgment
1	Article/Extended finite element method for quasi-brittle fracture	0.95
2	Article/Parameter identification in explicit structural dynamics: performance of the extended Kalman filter	0.95
3	Article/Unscented Kalman filtering for nonlinear structural dynamics	0.95
4	Article/Impact induced composite delamination: state and parameter identification via joint and dual extended Kalman filters	0.95
5	Article/Extended finite element simulation of quasi-brittle fracture in functionally graded materials	0.67
6	Article/Multi-scale Analysis of MEMS Sensors Subject to Drop Impacts	0.63
7	Article/Big Data Analytics and Structural Health Monitoring: A Statistical Pattern Recognition-Based Approach	0.90
8	Article/Model Order Reduction and domain decomposition strategies for the solution of the dynamic elastic–plastic structural problem	0.74
9	Article/Numerical analysis of rate-dependent dynamic composite delamination	0.83

10	Article/Investigation of computational and accuracy issues in POD-based reduced order modeling of dynamic structural systems	0.86
11	Article/Multi-scale analysis of polysilicon MEMS sensors subject to accidental drops: Effect of packaging	0.50
12	Article/Parameter identification of a time-dependent elastic-damage interface model for the simulation of debonding in composites	0.95
13	Article/Parallelized sigma-point Kalman filtering for structural dynamics	0.83
14	Article/Polysilicon MEMS accelerometers exposed to shocks: numerical–experimental investigation	0.49
15	Article/Fast unsupervised learning methods for structural health monitoring with large vibration data from dense sensor networks	0.93
16	Article/Online damage detection in structural systems via dynamic inverse analysis: A recursive Bayesian approach	0.95
17	Article/Optimization of sensor placement to detect damage in flexible plates	0.67
18	Article/Cost–Benefit Optimization of Structural Health Monitoring Sensor Networks	0.83
19	Article/Domain decomposition and model order reduction methods applied to the simulation of multi-physics problems in MEMS	0.65
20	Article/Monte carlo simulation of micro-cracking in polysilicon MEMS exposed to shocks	0.70
21	Article/Early damage assessment in large-scale structures by innovative statistical pattern recognition methods based on time series modeling and novelty detection	0.93
22	Article/Online damage detection via a synergy of proper orthogonal decomposition and recursive Bayesian filters	0.83
23	Article/Identification of Gurson–Tvergaard material model parameters via Kalman filtering technique. I. Theory	0.74
24	Article/An extended FE strategy for transition from continuum damage to mode I cohesive crack propagation	0.93
	TOTAL (rounded to first decimal place)	19.3

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 24 submitted publications have been ranked in the table above, with a maximum score of 1 for each publication. The scores have been proposed by taking into account the scientific level of the publication, its relevance for the scientific sector of this selection procedure, criteria and parameters recognized by the relevant international scientific community. The overall score confirms the high quality of the candidate's research. The variety of the topics addressed in the publications presented is excellent, as well as the scientific rigor and the innovative character. The personal contribution of the candidate emerges as very original and can be fully identified. Thus, the Selection Board evaluates as very positive the scientific papers presented by the candidate.

The candidate is author/co-author of 288 publications, of which 90 have appeared in scientific journals having a significant impact factor. Based on the database Scopus, the candidate reports an h-index equal to 28 and an overall number of citations of 2281. The candidate's scientific production is very good and remarkably continuous in time. The research activity has been mainly focused on themes of parameter identification, delamination in composite materials, reliability analysis of Micro-Electro-Mechanical-Systems, structural health monitoring, formulation of reduced order models, uncertainty quantification, analysis of the response of athletic surfaces, smart building skins. The overall scientific production has been assessed 6/6.

The candidate is member of the Editorial boards of the following journals: International Journal on Advances in Systems and Measurements, Inventions, Machines, Materials, Micro and Nanosystems, Micromachines, Sci. He is Section Editor-in-Chief of Algorithms, Associate Editor of Frontiers in Materials, and Section Associate Editor of Sensors. Since 2018 he

has been member of the Scientific Committees of 68 International Conferences. Since 2014 he is Co-chairman of the International Electronic Conference on Sensors and Applications (ECSA). He has been guest editor of 20 special issues on International Journals. In 2015, he has been a Founding Member of the Inter-Departmental Politecnico E4Sport - Engineering for Sport Laboratory. He is member of the Scientific Committee of PoliFab, the micro and nano technology center of Politecnico di Milano since 2019 and Member of EuMat Working Group 4 on Nanomaterials for Novel Structural and Functional Applications since 2021. These activities of scientific animation have been assessed 5/5.

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

The candidate has been teacher in around 50 academic courses, starting from the academic year 2004/2005. He carried out teaching activity in PhD courses, as well. He has been/is the supervisor of 13 PhD theses, and Main Tutor of 7 ASP (Alta Scuola Politecnica) multidisciplinary projects. He is member of the academic board for the PhD programme in Structural, Seismic and Geotechnical Engineering, Politecnico di Milano since 2014, and he is currently Head/Coordinator of the Faculty Board of the same Ph.D. Program. He is: Member of the Council of the School of Design of Politecnico di Milano since 2011. He is also member of the Teaching Commission of the Department of Civil and Environmental Engineering of Politecnico di Milano since 2013, and has been member of the Scientific Commission of the same Department (2020-2022).
Overall, the teaching activity of the candidate and his involvement in management pertaining to the teaching activities, is excellent.

SCIENTIFIC RESPONSIBILITY FOR FUNDED RESEARCH PROJECTS:

The candidate is local scientific responsible of the projects: HORIZON-MSCA-2021-DN-01: MIRELAI - MIcroelectronics RELiability driven by Artificial Intelligence (Industrial Doctorate); PNRR (National Recovery and Resilience Plan) to fund a scholarship related to Energy Transition & Environmental Impact; PNRR (National Recovery and Resilience Plan), National Center on High Performance Computing, spoke on Quantum Computing. He has been the PI (project coordinator) of Safer Helmets, a Fondazione Cariplo project related to Scientific and Technological Research on Advanced Materials 2013. The candidate is also scientific responsible of the following projects with private companies: Copper-Resin adhesion: characterization and modelling (with STMicroelectronics); The creation of "digital twin" models for MEMS structures (with Robert Bosch); Smart sensors for microfluidics (within a Joint Research Center with Fluid-o-Tech and STMicroelectronics).
Overall, the involvement in research projects is excellent, as well as the amount of funding granted.

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 co-inventor of 2 patents.

SCRUTINY OF THE DEGREE OF KNOWLEDGE OF THE ENGLISH LANGUAGE:

Based on the English language used in the candidate's publication, it can be inferred that the candidate has a very good knowledge of this language.

CANDIDATE: Placidi Luca

CURRICULUM:

The candidate received a degree (cum laude) in physics in 2001, a M.S. degree in Mechanical Engineering in 2002, a Ph.D. degree in Mechanik in 2004, and another Ph.D. degree in Theoretical and Applied Mechanics in 2006. He is currently Associate Professor at the Faculty of Engineering of the International Telematic University UNINETTUNO. He spent research periods in foreign institutions: at the Low Temperature Institute University (Hokkaido) of Sapporo in Japan (2005); at the Poly Technical University of New York (2007); at the Institut de Mathématiques de Toulon et du Var (2007 and 2015); at the Université Paris-Est Créteil Val de Marnein (2015); at the Laboratoire de Géologie, Ecole normale supérieure (2016).
Also based on the scientific, didactic, funded research and technology transfer activities commented in what follows, the Selection Board expresses a very positive evaluation on the candidate curriculum.

SUBMITTED PUBLICATIONS:

No. of publications	Type/Title of Publication	Judgment
1	Article/On a hemi-variational formulation for a 2D elasto-plastic-damage strain gradient solid with granular microstructure	0.56
2	Article/A block-based variational elasto-damage model for masonry analysis inspired from granular micromechanics: Preliminary study	0.50
3	Article/Hemivariational continuum approach for granular solids with damage-induced anisotropy evolution	0.81
4	Article/Micromechanics-based elasto-plastic–damage energy formulation for strain gradient solids with granular microstructure	0.72
5	Article/Identification of a geometrically nonlinear micromorphic continuum via granular micromechanics	0.72
6	Article/Two-Dimensional Analysis of Size Effects in Strain-Gradient Granular Solids with Damage-Induced Anisotropy Evolution	0.49
7	Article/A damaged non-homogeneous Timoshenko beam model for a dam subjected to aging effects	0.74
8	Article/Granular micromechanics-based identification of isotropic strain gradient parameters for elastic geometrically nonlinear deformations	0.58
9	Article/A novel structural resilience index: definition and applications to frame structures	0.72
10	Article/Pantographic beam: a complete second gradient 1D-continuum in plane	0.50
11	Article/On the validity range of strain-gradient elasticity: A mixed static-dynamic identification procedure	0.93
12	Article/A Strain Gradient Variational Approach To Damage: A Comparison With Damage Gradient Models And Numerical Results	0.83
13	Article/Energy approach to brittle fracture in strain-gradient modelling	0.86
14	Article/Discrete and continuous aspects of some metamaterial elastic structures with band gaps	0.76
15	Article/Identification of two-dimensional pantographic structure via a linear D4 orthotropic second gradient elastic model	0.83
16	Article/A variational approach for a nonlinear one-dimensional damage-elasto-plastic second-gradient continuum model	0.78
17	Article/Gedanken experiments for the determination of two-dimensional linear second gradient elasticity coefficients	0.72
18	Article/At the origins and in the vanguard of peridynamics, non-local and higher-gradient continuum mechanics: An underestimated and still topical contribution of Gabrio Piola	0.93
19	Article/Reflection and transmission of plane waves at surfaces carrying material properties and embedded in second-gradient materials	0.90

20	Article/Microcantilever dynamics in tapping mode atomic force microscopy via higher eigenmodes analysis	0.74
21	Article/Linear plane wave propagation and normal transmission and reflection at discontinuity surfaces in second gradient 3D continua	0.74
22	Article/Application of a continuum-mechanical model for the flow of anisotropic polar ice to the EDML core, Antarctica	0.56
23	Article/A mixture theory framework for modeling the mechanical actuation of ionic polymer metal composites	0.83
24	Article/Thermodynamics of polycrystalline materials treated by the theory of mixtures with continuous diversity	0.67
	TOTAL (rounded to first decimal place)	17.4

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 24 submitted publications have been ranked in the table above, with a maximum score of 1 for each publication. The scores have been proposed by taking into account the scientific level of the publication, its relevance for the scientific sector of this selection procedure, criteria and parameters recognised by the relevant international scientific community. The overall score confirms the high quality of the candidate's research. The variety of the topics addressed in the publications presented is good, with a very good scientific rigor and innovative character. The personal contribution of the candidate emerges as original and can be easily identified. Thus, the Selection Board evaluates as very good the scientific papers presented by the candidate.

The candidate is author/co-author of 206 publications, of which 90 have appeared in scientific journals having a significant impact factor. Based on the database Scopus, the candidate reports an h-index equal to 36 and an overall number of citations of 3690. The candidate's scientific production is very good and remarkably continuous in time. The research activity has been mainly focused on themes of micro-structured continua, granular micromechanics, variational approaches, second gradient and micromorphic continua, anisotropic constitutive laws, fatigue and aging, resilience, robust and compartmentalized structures, propagation of bulk waves and dispersion relation, theory of mixtures, fluid saturated porous media, ionic polymer metal composite, polycrystalline materials. The overall scientific production has been assessed 6/6.

The candidate is member of the Editorial board of Nanomechanics Science and Technology: An International Journal, Vestnik of Tomsk State University of Architecture and Building, Continuum Mechanics and thermodynamics, BMC Mechanical Engineering. He was member of the Scientific Committee of the EUROMECH-Colloquium 579, member of the Scientific committee of the International research center "Mathematics and Mechanics Of Complex Systems" (M&MOCS). These activities of scientific animation have been assessed 4/5.

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

The candidate has been teacher in around 40 academic courses at UniNettuno, starting from the academic year 2013/2014; he has been also tutor for a large number of other courses, spanning from Scienza delle Costruzioni (Structural Mechanics), to Tecnica delle Costruzioni (Structural Engineering), Geologia geodesia e geotecnica, Ingegneria delle gallerie e delle fondazioni. He carried out teaching activity in PhD courses, as well. He was the supervisor of 2 PhD theses. He was member of the academic board for the PhD programme in Mathematics and models, of the University of L'Aquila (2017-2022), and since 2022 he is member of the council of the Doctoral School in Ingegneria dell'innovazione tecnologica of the International Telematic University Uninettuno, and Member of the council of the National Doctoral School in "Defense against natural risks and ecological transition of built environment" of the Università degli Studi di Catania.
Overall, the teaching activity of the candidate and his involvement in management pertaining to the teaching activities, is good.

SCIENTIFIC RESPONSIBILITY FOR FUNDED RESEARCH PROJECTS:

The candidate was scientific responsible of the project "Effetti della caduta massi su costruzioni e infrastrutture civili e industriali" funded by Regione Valle D'Aosta; scientific co-responsible of two projects taken by CNRS International Associate Laboratory Coss&Vita; scientific responsible of the project "AI4BS", POR FESR LAZIO – AVVISO BIOEDILIZIA E SMART BUILDING; scientific responsible of the project "Modellazioni analitiche del degrado".
Overall, the involvement in research projects is sufficient, as well as the amount of funding granted.

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 reports 1 patent filed and no participations in spin-offs.

SCRUTINY OF THE DEGREE OF KNOWLEDGE OF THE ENGLISH LANGUAGE:

Based on the English language used in the candidate's publication, it can be inferred that the candidate has a very good knowledge of this language.

THE SELECTION BOARD

Prof. MOËS Nicolas *(Chairman)* N. MOËS

Prof. MOLINARI Jean-François *(Member)* _____

Prof. FRANGI Attilio Alberto *(Secretary)* _____

POLITECNICO MILANO 1863

PUBLIC SELECTION ESTABLISHED WITH DIRECTOR'S DECREE NO. 2022_PRO_DICA_2 OF 29/09/2022 PURSUANT TO THE NOTICE PUBLISHED IN THE OFFICIAL GAZETTE NO. 21/10/2022, n. 84 FOR 1 POSITION AS FULL PROFESSOR FOR THE COMPETITION SECTOR 08/B2 - STRUCTURAL MECHANICS - SDS ICAR/08 - STRUCTURAL MECHANICS, PURSUANT TO ART. 18 - LAW 240/2010, AT THE POLITECNICO DI MILANO - DEPARTMENT OF CIVIL AND ENVIRONMENTAL ENGINEERING (PROCEDURE CODE 2022_PRO_DICA_2).

ATTACHMENT No. 2 to the FINAL REPORT

MERIT RANKING

SURNAME AND NAME	Overall score
Mariani Stefano	82.3
Ardito Raffaele	80.6
Brighenti Roberto	76.3
Fedele Roberto	67.6
Placidi Luca	66.4

Milan, 22/02/2023

THE SELECTION BOARD

Prof. MOËS Nicolas *(Chairman)* Nicolas Moës

Prof. MOLINARI Jean-François *(Member)* _____

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