SELECTION OF ONE PROFESSOR (LEVEL 1 – FULL PROFESSOR), FOR THE ACADEMIC RECRUITMENT FIELD 09/A2 "APPLIED MECHANICS" AT THE INSTITUTE OF COMMUNICATION, INFORMATION AND PERCEPTION TECHNOLOGIES (TECIP) - ACADEMIC CLASS OF EXPERIMENTAL AND APPLIED SCIENCES, RESERVED, PURSUANT TO ART. 24, SUBSECTION 6, OF ITALIAN LAW 240/2010, FOR ASSOCIATE PROFESSORS AND RESEARCHERS EMPLOYED AT THE SCHOOL, ISSUED BY RECTOR DECREE NO. 446 DATED 26/07/2017.

FINAL REPORT

The year 2017, the13rd day of the month of October at 4.15 pm, the evaluation Committee met via Skype conference to review the selection process for the recruitment of level 1 professor for Academic Recruitment Field 09/A2 "Applied Mechanics" at the Institute of Communication, Information and Perception Technologies (TeCIP) of the Scuola Superiore di Studi Universitari e di Perfezionamento Sant'Anna di Pisa reserved for associate professors and researchers employed at the School to be selected pursuant to art. 24, subsection 6 of the Italian law 240/2010. The Committee, nominated by decree No. 494 dated 15/09/2017 by the Rector, is composed of:

Prof. Fabio Anastasio Recchia

- Prof. Vincenzo Parenti Castelli
- Prof. Vincent Hayward
- Prof. Hong Tan
- Prof. Massimo Callegari
- Prof. Alessandro Gasparetto

The Committee completed its work on the following days:
Preliminary meeting: on October, 6, 2017 via teleconference
Second meeting: on October 13, 2017 via teleconference

The Committee held a total of 2 meetings, and began its work on October, 6, 2017 and concluded it on October 13, 2017.
In the preliminary meeting, the Committee nominated the President and the Secretary. It was noted in the minutes that each member had declared that they had no kinship or affinity up to the fourth degree inclusive, either with each other or the candidate Prof. Antonio Frisoli. The Committee established the date by which their work would be concluded and the criteria for the assessment of the candidate.

In the second meeting the Committee examined the publications, the CV and the didactic activity of the candidate, and after a comprehensive discussion, by unanimous vote declared the following candidate to have won the position:
Antonio FRISOLI

Read, approved and signed.

THE COMMITTEE

ANNEX 1 – INDIVIDUAL ASSESSSMENTS OF THE CANDIDATE ANTONIO FRISOLI

Individual assessment by Prof. Vincenzo Parenti Castelli

In accordance with the Italian Ministerial Decree 344/2011 and with the criteria agreed upon by the Commission at the preliminary meeting this individual report is based on the following criteria: i) teaching, supplementary teaching and service to students; ii) scientific publication; iii) scientific research.

Antonio Frisoli is Associate Professor in Mechanical Engineering and Robotics (09/A2 Applied Mechanics) at Scuola Superiore Sant'Anna and Head of the Human Robot Interaction (HRI) area at the TeCIP Institute (Institute for Communication, Information and Perception Technologies of Scuola Superiore Sant'Anna.

i) Teaching, supplementary teaching and service to students

Antonio Frisoli performed a continuous and very intense teaching activity. He taought several courses ranging from Mechanics of Robots, Control, Virtual reality, Biomechanics to CAD and FEA design of robot manipulators in a number of Universities. He advised a great number of Master and PhD theses. The candidate received a high appreciation for the quality of his teaching as well as for his involvement in teaching management and organization activities.

ii) Scientific publications

The publications presented by the candidate for the selection procedure as well as most of all his publications are of high scientific level and published in international journals of excellent scientific ranking and high reputation within the international scientific community. A number of book chapters is also presented which shows the intense and continuous activity of the candidate. Moreover, seven patents highlight the industrial relevance of his scientific activity.

iii) Scientific research

The candidate research interests deal with the design and control of spatial robots with high performance, the study and development of new advanced human-machine interfaces, and in particular robotic exoskeletons and wearable robots, haptic interfaces and wearable haptics, issues of theoretical kinematics and applied to the study of new mechanisms and parallel manipulators, design and development of novel robotic systems for the neuro-motor rehabilitation in virtual environments, robotic-aided rehabilitation, novel human robot interfaces based on electrobiological signals (EEG, EMG), e.g. BCI, investigation of sense of presence and multisensory interaction in virtual environments, biorobotics and cognitive robotics.

The scientif research of the candidate is wide and of very high level and so it is the organization leadership and involvemnet he clearly showed in national and international projects. Some results of his research work, such as the theoretical studies on three degrees of freedom parallel manipultators, are outstanding and open the door to important theoretical and practical developments. He pursued high results also after he achieved the positive national evaluation for the position of Level 1 Italian professor (professore ordinario).

I have been involved in some of the research activities of Antonio Frisoli and I had the chance to appreciate his scientific and human qualities. Based on this and the criteria evaluations reported above I express my full agreement on the academic recruitment of Antonio Frisoli as candidate to the position of Professore ordinario (Level 1 Italian University Professor).

Individual assessment by Prof. Vincent Hayward

Prof. Frisoli is very well recognized internationally for his research, particularly in the the design of complex mechanical systems, in the modelling and control of high-performance transmissions in robotic systems, and in the development of novel kinematic designs for haptic interfaces and portable haptic devices. In his scientific career, Prof. Antonio Frisoli has contributed significant results in the areas of advanced kinematics for robotics and haptic interfaces which are characterized by a solid understanding of the fundamentals of the theory of mechanisms, implementation of advanced electromechanical systems, including their controls, combined with creative inventiveness, attention to detail, and technological excellence.

I understand that Prof. Frisoli's promotion to the level of of Professore ordinario depends on the evaluation of specific criteria, namely, scientific production and contributions to the profession, leasership and participation in national and international projects, collaborations with academic bodies and industries, teaching and supervision, which I to address in turn.

Dr. Frisoli's production is excellent, showing a solid and sustained record of scientific articles which much above the expected production of researchers in engineering. In addition, he has authored or co-authored more than one hundred articles in well-selected international conferences. It must be noted that some his publications are in prestigious, high-impact interdisciplinary journals, such as PLOS One, or neuroscience and medical and rehabilitation journals, which is evidence of highly successful collaborations with experts in other fields. As a results of this production Dr. Frisoli has become a well-recognized researcher and teacher by his peers for his ability to apply the theory and the practice of complex mechanical systems to problems of contemporary importance in neuroscience and medicine.

Concomitantly he has been able to remain at the forefront of this area, consistently and regularly expounding innovative ideas. It must also be noted that Dr. Frisoli has been a generous contributor to the profession, having been appointed, inter alia, associate editor of the prestigious journal Presence, a reference in his field, and participating in a large number of editorial boards of international conferences.

In addition to these activities, Dr Frisoli participated or lead a notable number of international and national projects at a level which is much higher that what is expected from a researcher at this career stage. Such success is certainly the result of the high degree of esteem in which is his is held by his colleagues. This activity has certainly greatly contributed in bringing international recognition and prestige to the Scuola Superiore Sant' Anna and the units in which he operates.

In terms of collaborations, as already alluded to, the work of Prof. Frisoli is exemplary. His collaborators are from diverse fields, neuroscience, medicine, automatic control, movement science, human perception, and robotics and distributed in the best institutions, worldwide (Fondazione Santa Lucia, Stanford University, McGill University, DLR Institute for Mechatronics, University of Utah, University of Ulm, University College London, and more), guaranteeing a sustained flow of exchange of ideas.

Finally, Dr. Frisoli is an accomplished teacher and mentor. He has taught fundamental courses in mechanical systems in the areas of kinematics and dynamics and key advanced courses in the application of mechanical systems to rehabilitation and virtual reality. Most remarkably, he has advised more than twenty PhD students most of whom who have pursued academic and industrial careers, not mentioning a large number of undergraduate theses, and participated as instructor in more than twenty workshops and summer-schools attended by numerous graduate students.

From these observations, this evaluator fully agrees with the assessment that Prof. Antonio Frisoli has performed much above the level expected from someone at a similar career stage and in that he could be favourably compared to many of his peers at the best institutions world-wide. Clearly, he is fully qualified for the position of position of Professore ordinario, a position for which has my

unreserved support.

Individual assessment by Prof. Hong Tan

I have known Prof. Frisoli well, since when he was still a PhD student of Prof. Massimo Bergamasco. I've watched Prof. Frisoli grow professionally over the years. He has become a leading expert in haptics and robotics. We have also worked together in organizing haptics conferences and activities in the international haptics community. My assessment of Prof. Frisoli in the three areas of teaching, scientific publication and scientific research is as follows.
Teaching. Prof. Frisoli's teaching record is very strong, in terms of the number of courses he has taught, and the graduate students he has supervised.
Scientific Publication. Prof. Frisoli's Google Scholar Citation shows a total Citation of 3154, H-index of 29 and i10-index of 81. His citation record has increased sharply and steadily since 2010, indicating very productive scientific investigation activities and increasing impact on the research field. He has six publications with total citations of 99 or higher. As a whole, the publication record has been intense, continuous and of high quality. Each publication is consistent with the specific profile of the call. The publications are in top journals and conferences of the haptics, robotics and scientific community. Prof. Frisoli's publication record supports his full qualification for a position of Full Professorship.
Scientific Research. Prof. Frisoli has consistently conducted original and rigorous research that lead the way in the international research community. He was one of the first to work on contact location displays to supplement force displays by conveying cutaneous information on the fingertip to enhance perception of an object's local curvature. He has conducted extensive research on robotics and haptics for rehabilitation, including collaborating with clinicians to show the impact of his work on real patients. Recently, he has led the research in large collaborative EU research projects on devising lighter and compact haptic displays for wearable applications. Prof. Frisoli has also contributed greatly on conference editorial boards and meeting organization committees. He is well known in many research fields (haptics, robotics, rehabilitation, human computer interaction) for his scientific achievements and for his dedication in services to the research community.
Based on the above achievements this evaluator expresses her full agreement for the academic recruitment of the candidate Antonio Frisoli to the position of Professore ordinario (Level 1 Italian University Professor).

Individual assessment by Prof. Massimo Callegari

The candidate gained a significant teaching experience by lecturing several different courses at Scuola Sant'Anna and at the Universities of Pisa and Udine for the Faculties of Engineering and Medicine. At Scuola Sant'Anna has been teaching both basic subjects and advanced topics for more than ten years at different levels of university degree, including Ph.D. for which he had been tutor or advisor of 16 candidates. He also promoted international educational activities on robotics and automation at workshops and symposia and organized an International Master in Virtual Environments.
The overall scientific production of the candidate is continuous over time and characterized by a relevant impact: the 142 documents referenced in the Scopus database have received altogether 1,650 quotations and give him a Hirsch index of 18. The candidate submits 18 articles published in journals with excellent reputation and 2 contributions published in Congress proceedings that received 185 and 125 citations respectively. The topics cover a large field of subjects, including exoskeletons and wearable robotics, haptic devices, robotic rehabilitations and kinematics. The

publications are highly innovative and relevant to the profile of the call; they represent original contributions to the advancement of the state-of-the-art of our community in key areas of currents international research, as shown by the high number of citations received.
The candidate has a large experience in the development and management of scientific research at national and international level: he is currently principal investigator of two EU projects under the FP7 and the Horizon 2020 frameworks, besides his involvement in national research projects funded by private firms or public bodies. In the past years he has been very active as well as responsible of two EU projects and many research projects with industrial partners. The candidate has established research collaborations with important national and international institutions and researchers, whose results are shown in the list of publications. The 6 national and international patents listed in his CV and the innovative start-up he founded testify his capability to transfer to industry and society at large the results of his research activity. In the end, it is positively evaluated candidate's activity as associate editor of important international journals and his commitment for the organization of Conferences, Workshops and Tutorials.
Based on the above achievements this evaluator expresses his full agreement for the academic recruitment of the candidate Antonio Frisoli to the position of Professore ordinario (Level 1 Italian University Professor).

Individual assessment by Prof. Alessandro Gasparetto

The candidate Antonio FRISOLI has been assessed considering the three criteria defined in the first meeting of the evaluation committee, in accordance with the Italian Ministerial Decree 344/2011.
1. Teaching, supplementary teaching and service to students
The number of courses taught by the candidate, both at Scuola Superiore Sant'Anna and at University of Pisa, is relevant and his teaching activities are continuous. The results of official feedback from students on the courses taught meet the quality criteria. He was Advisor or jury member in several PhD dissertations, both at Scuola Superiore Sant'Anna and at foreign institutions, and tutored undergraduate students. Moreover, he participated to some University boards linked to teaching activities.
2. Publications
The scientific production of the candidate is, as a whole, consistent, intense and continuous from a temporal point of view, even after the achievement of the "Abilitazione Scientifica Nazionale". All the scientific publications presented by the candidate show originality, innovation, methodological rigor and relevance. Each publication is consistent with the specific profile of the call. All the publications have an important editorial collocation, namely in journals with a relevant impact factor within the scientific community. The bibliometric indicators of the candidate are more than adequate for the position of Full Professor.
3. Scientific research
The candidate had tasks of organisation, leadership and coordination in national and international research groups or participation therein with leading roles. He also had the role of Principal Investigator in several research projects funded under competitive calls, both at the national and European level. The candidate showed the capacity to attract research funding from public or private institutions. He participated as a speaker in many national and international conferences, achieved national and international awards for research activities, was author of 6 patents and participated to the foundation of a spin-off. Moreover, he has the role of associate editor for some scientific journals, organized several conferences, summer schools and workshops, and achieved several awards at conferences.
Based on the above assessment, this evaluator expresses his full agreement for the academic recruitment of the candidate Antonio FRISOLI to the position of Professore Ordinario (Level 1

Italian University Professor).

ANNEX 2 – COLLEGIAL ASSESSSMENT OF THE CANDIDATE ANTONIO FRISOLI

In accordance with the Italian Ministerial Decree 344/2011 and with the criteria agreed upon by the evaluation committee at the preliminary meeting, the following criteria have been taken into consideration:

i) teaching, supplementary teaching and service to students;
ii) publications;
iii) scientific contributions to research.

The candidate Antonio FRISOLI has been evaluated by this committee and assessed according to the above-mentioned criteria.

With respect to the first criterion, the teaching activity of the candidate is abundant and sustained. He taught several courses, tutored many PhD and master students and his teaching activity was appreciated by the students.

With respect to the second criterion, the overall scientific production of the candidate is continuous over time and characterized by significant impact, including for the benefit of the society. The publications are highly innovative and relevant to the profile of the call.

With respect to the third criterion, the candidate showed relevant capabilities of coordination of a research group, having been Principal Investigator of several projects, also at the European level. He is well known in the scientific field at the international level, being an invited speaker in numerous conferences and serving as Associate Editor for some journals. His technology transfer capabilities are proven by the ownership of some patents and by the participation in the founding of a spin-off company.

Overall, the profile of the candidate is excellent with respect to all the indicators listed above, therefore this Committee expresses full agreement for the academic recruitment of the candidate Antonio FRISOLI to the position of Professore Ordinario (Level 1 Italian University Professor).

Prof. Vincenzo Parenti Castelli 

Prof. Vincent Hayward

Prof. Hong Tan

Prof. Massimo Callegari

Prof. Alessandro Gasparetto

Prof. Fabio Anastasio Recchia