Translation of the Director's Decree n. 400 dated 16.05.2023

Selection for the conferment of two PhD fellowships in Theoretical and Scientific Data Science financed by the Piano Nazionale di Ripresa e Resilienza (PNRR) DD.MM. 117 and 118 dated 02.03.2023- Academic year 2023/24

Position 1 - Missione 4, Componente 1 "Potenziamento dell'offerta dei servizi di istruzione: dagli asili nido all'Università" – D.M. 118/2023

Progetto: Scalable machine learning for natural sciences
The project will develop machine learning algorithms and Bayesian inference techniques to enable data-driven scientific discovery in the natural sciences, including topics of algorithmic efficiency, uncertainty quantification and model flexibility. Application areas include but are not limited to cosmology, astronomy, bioinformatics, materials and theory of neural networks.

Periods of study and research abroad from a minimum of 6 to a maximum of 18 months are foreseen.

Position 2 - Missione 4, Componente 2 "Dalla Ricerca all'Impresa" - D.M. 117/2023

Applied Physics - Machine Learning and Systems Biology - "Study of geometric deep learning algorithms from the point of view of the differential geometry of the data space, and of bundle theory as a general formalism in which to frame learning algorithms" in collaboration with Additati & Partners Consulting S.R.L.

Geometric deep learning straddles a number of algorithms which aim to incorporate the geometry of data space (in terms of a data manifolds) within modern prediction engines. Recently, a formalisation has been proposed by Bronstein et al (https://arxiv.org/abs/2104.13478) which attempts to unify several strands of geometric deep learning in a common framework. The project will investigate the mathematical foundations of geometric deep learning, with particular regards to its robustness, efficiency and interpretability. The project will be in collaboration with the Mathematics Area of SISSA, and the Theoretical Physics group at Università and Politecnico di Torino.

Periods of study and research are foreseen both in partner companies and abroad, from a minimum of 6 to a maximum of 18 months.

The Ph.D programmes, which will be activated after approval of the MUR as foreseen by D.M. 226/2021, have a duration of 4 years with the possibility of obtaining the title at the end of the third year, and are based on teaching and research activities, with examinations to determine admission from one year to the next and the attainment of the Ph.D degree.

Fellowship and other benefits:

The School awards fellowships for a maximum of 4 years the amount of which is, at the moment, of € 16.242,96 gross per year (about 12% tax).

Position 1:
For the first three years the fellowship will be financed by D.M. 118 funds. The fourth year will be financed by SISSA funds.

Position 2:
For the first three years the fellowship will be co-financed by D.M. 117 and Additati & Partners Consulting S.R.L. funds. The fourth year will be co-financed by SISSA and Additati & Partners Consulting S.R.L. funds.

Admitted candidates will be awarded an "una tantum" contribution for settlement costs equal to € 500.00 if domiciled in a country belonging to the European Union and equal to € 1,000.00 if domiciled in non-European countries.

A contribution towards living expenses of the amount of €150,00 gross per month will be awarded to those who will subscribe a registered rent contract in the Trieste province.

A "laptop contribution" up to € 400,00 may be granted upon request and presentation of the relevant invoice.

A contribution towards the expenses to be enrolled in the health insurance system up to € 198,77 will be granted to non-EU students only.

Students enrolled in the third/fourth year can request a contribution of up to € 1.000,00 for their access to training and/or to create a network of academic contacts to help them in their future career.

A contribution (70% of the amount of the fellowship) may be awarded to students who should be forced to suspend their activity due to illness, maternity or other serious reasons up to 5 months.

For more information: Welfare - Interventi al personale | Scuola Internazionale Superiore di Studi Avanzati (sissa.it)

● **Requirements:**

The School welcomes applications from young candidates who are going to complete or soon after completion of their undergraduate studies with a strong interest in research.

Applications can be submitted, without age and citizenship limitations, by those who have a "Laurea Magistrale" degree or a similar qualification (i.e. Master of Science) obtained abroad, deemed suitable at discretion of the examining commission. The title must be held by the date of enrolment in the Ph.D Course, under penalty of forfeiture of admission to the Course.

- **Online application:**

An online application must be filled and sent using the procedure available at the page **https://pica.cineca.it/sissa/** **by 20th June 2023 13.00 hrs (CEST).**

Candidates should upload the following documents in pdf format:

- curriculum vitae et studiorum;
- a certificate of University examinations taken (with marks);
- a final degree certificate;
- If, at the time of application, candidates should not be yet in possession of a degree certificate, they can submit it at the time of the examination. European Union candidates can submit a personal declaration instead of the aforementioned certificates.
- a copy of the diploma thesis (if any).

Candidates with a certified disability, can report their needs related to the exams in a specific section of the online procedure.

At the end of the procedure, candidates will have to indicate the names and email addresses of two professors that will receive an email requesting to send a recommendation letter through the same online procedure **within two days of the announcement expiry date.**
The candidate will then have to print out the admission request form, sign it and send it through the same online procedure.

Candidates with special needs are invited to state them in the admission request.

● **Selection Procedure:**

After the deadline of the announcement, the Selection Committee, will evaluate the documentation produced by the candidates (*curriculum vitae*, letters of recommendation, etc.). Candidates who have obtained a minimum score of 7/10 will be invited to take the written test via zoom on **28th June 2023**. Those who will obtain a minimum mark of 28/40 in the written test, will be admitted to the interview which will be held between **12th and 13th July 2023** via zoom, with scheduled times that will be communicated later on.
Eligibility is achieved with a minimum mark of 35/30 in the interview.

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For both tests the candidate should be reachable at the address indicated in the application, at the time communicated by SISSA through email.

Candidates should show an ID document for identification at the beginning of the interview. The absence of a contact email in the application or of a valid ID during the interview, imply the exclusion from the competition.

● **Admission:**

The admitted candidates will be notified by email and will be asked to be present at SISSA on 2nd October 2023, for the registration.

Failure to do so without a valid reason will result in the loss of the fellowship awarded.

In order to be enrolled and to be awarded the fellowship, admitted candidates must pay a "Regional Tax" of the amount of € 120,00 - € 160,00 per year. Information can be retrieved at http://www.ardiss.fvg.it/.

For information about rights and duties of the doctoral students please consult the Teaching Regulations of the PhD courses of SISSA.

As per Legislative Decree 30.06.2003 n.196, and of the European Regulation 2016/679 (General Data Protection Regulation), we inform that all data given to this Administration will be processed only for purposes related to and instrumental to the existing contract, in compliance with the provisions in force.

The Director
Prof. Andrea Romanino
(digitally signed)

ri/

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