INAF
ISTITUTO NAZIONALE
DI ASTROFISICA

Osservatorio Astronomico di Roma

Subject: Selection procedure by qualifications and possible interview for the assignment of one Postdoc research grant as part of the science project: "Development and optimization of algorithms with Machine Learning techniques for reduction and analysis of data from astronomical instruments with particular regard to images produced by Cherenkov telescopes".

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The Director of the "Osservatorio Astronomico di Roma"

- **In accordance** with Law n. 240 dated 30 December 2010 and its art. 22 in particular;
- **In accordance** with the guidelines for non-permanent staff position recruitment approved by INAF Administrative Council on January 30th 2018 that have introduced specific seniority parameters of educational qualification (N1) and maximum duration of research grants (N2) at the INAF, while providing for the possibility of exemptions for special calls;
- **In accordance** with the provisional guidelines for the assignment of research grants approved by INAF Administrative Council on January 29rd 2019;
- **In accordance** with the request by Dr. Lucio Angelo Antonelli, P.I. of the project "ASTRI (Fondo Pluriennale SKA-CTA 2019)";
- **Ascertained** the financial coverage with the funds of the projects TECHE.IT F.O. 1.05.06.04.01, Premialità 2016 F.O. 1.05.06.12 e INDIGO-DataCloud F.O. 1.05.02.10.04, allocated in balance 2022,

DECREES

Art. 1- Research Project

A call is open for a selection procedure on the basis of candidates' qualifications, possibly integrated by an interview, for the assignment of one Postdoc research grant of the duration of 1 year, entitled: "Development and optimization of algorithms with Machine Learning techniques for reduction and analysis of data from astronomical instruments with particular regard to images produced by Cherenkov telescopes".

Research will be carried at INAF-Osservatorio Astronomico di Roma. The successful candidate will work in collaboration with the project leader, Dr. Lucio Angelo Antonelli.

Thematic areas of the research grant:

• Development of software for Image Processing and Analysis of astrophysical images and catalogs;
• Extraction, characterization and classification of astrophysical objects and events such as those observed by Cherenkov telescopes (e.g. Cherenkov Telescope Array (CTA) and its precursors: MAGIC, LST, SST, ASTRI Mini-array) through the development of algorithms for Machine Learning

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operations and deployment of deep learning models and techniques with self-attention mechanism (transformers);

• Integration of the developed codes in existing astronomical software and implementation on hardware infrastructure both CPU and GPU cluster oriented;

• Support for the definition and review of software documentation (use cases, software requirements, software design, ...).

The Research Grant, aimed at the specified project, is not thought to satisfy the personnel needs of the Institute or of the project itself, but offers the opportunity of carrying out research activities in the framework of the project to candidates who believe that it can be important for their professional growth.

It is specified that the present selection procedure is simultaneously aimed at:

- offering an opportunity of professional growth to young people who hold the requirements for the present selection, who want to experience the national and international research environment, in a perspective of turnover and mobility, that is acquire specific expertise in the context of fix-term projects and/or research activities;

- holding positions that stands outside planning of permanent staff recruitment and that, consequently, do not represent binding prerequisite for emplyment as permanent staff of INAF.

Art. 2 – Requirements for participation

Participation to the selection is reserved to Italian and foreign citizens holding the following minimum requirements:

• Ph.D. degree in Physics or Astrophysics or Engineering or Computer Science or equivalent degree, issued by an Italian or foreign Advanced Studies Institute or University;

or

• Master degree (or 2nd level Laurea degree, if issued by an Italian University) either in Physics or Astrophysics or Engineering or Computer Science, or equivalent degree which would formally entitle to the admission to a doctorate awarded by an Italian or a foreign university, together with at least three years of documented experience in scientific or technological activities after the degree. Equivalence will be set by the selection committee according to criteria defined for the purpose of the selection procedure.

A good knowledge of English is required.

The following skills and experience will be considered as preferential qualifications:

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• Good knowledge of Python / R / Pytorch / Tensorflow programming languages;

• Knowledge of Machine Learning and Deep Learning techniques;

• Knowledge of optimization methods for Machine Learning;

• Knowledge of statistical methods of data analysis.

Art. 3 – Application

1 - Applications must be submitted in English by means of:

• *for Italian citizens*: from certified e-mail, including all the required documents in PDF format, sent to inafoaroma@pcert.postecert.it. The documentation needs to be sent to the indicated address only from a personal certified mail (pec) (not ordinary mail) **by Febraury 18, 2022 – 23:59 CET**. Only certified emails sent through one of the email providers included in the list of the AgID (Agenzia dell'Italia Digitale) according to DPR no. 68 of 11/02/2005, will be accepted.

• *for foreign citizens*: from ordinary electronic mail (e-mail) to the address inafoaroma@pcert.postecert.it (an email will be sent to the candidate confirming receipt of the application) or express courier to INAF-Osservatorio Astronomico di Roma – Via Frascati 33, 00078 Monte Porzio Catone (RM). The applications need to arrive **not after Febraury 18, 2022 – 23:59 CET** (postmark date will not be sufficient). Late submissions will not be considered.

Applications which are not consistent with the attached forms (Annexes 1 and 2) or without the applicant's signatures or not submitted in the manner provided for in the call will be excluded from the selection procedure.

The applications must be delivered reporting on the envelope or in the e-mail subject the following sentence:

"Application selection**: Post Doc MACHINE LEARNING"**

Aware that false declarations are against the law and that the Administration will carry out random checks on their accuracy, the applicant under his/her own responsibility, must clearly and precisely state in the application the following:

- name(s) and surname, date and place of birth, nationality, place of residence and address for correspondence;

- that s/he satisfies all the requirements described in article 2 of this Call;

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- that s/he is aware of and is not ineligible under any of the restrictions described in article 4 of this Call. The lack of any of the above mentioned declarations will determine the exclusion from the selection procedure for incomplete application.

For selection purposes the applicants shall directly state any academic qualifications in the application form (Annex 1).

In addition, non-EU citizens residing outside Italy, if successful, must produce originals or suitably certified copies of academic qualifications obtained outside Italy.

2 - The following documents have to be submitted:

- Complete Application Form, as provided in the Annex 1 of this announcement;

- Signed Declaration in lieu of affidavit (Art. 19 - 46-47 the DPR 28th December 2000, n. 445), as provided in the Annex 2 of this announcement;

- "Curriculum vitae", signed and dated by the applicant including a list, if applicable, of grants and fellowships held in the past or in progress;

- Statement of research interests and qualifications;

- List of publications and any other title deemed relevant for the application;

- Copy of a valid identity document (ID card or passport);

3 - Applicants are admitted to the selection with reserve and may – at any time – be notified of **exclusion** from the selection procedure for the following reasons:

- **submission of the application after the deadline;**

- **incomplete and/or unsigned application form;**

- **missing copy of a valid identity document;**

- **non compliance the requirements indicated in paragraph 2.**

Should the reasons for exclusion be determined after completion of the selection procedure the applicant will lose any right deriving from participation in the selection procedure; similar loss will be applied to applicants providing any false statement or document.

INAF accepts no responsibility for lost applications or documents when the applicant provided incorrect contact details or failed or delayed in notifying any changes to these details.

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Art. 4 - Ineligibility and incompatibility with other funding

Full professors, associate professors and researchers of Italian Universities and employees of Italian public research institutions are all excluded from entering the competition.

The grant is not compatible with the attendance of academic courses as those that formally give access to a doctorate, as well as with Ph.D. fellowships. For employees of the Italian Public Administration (Italian State) unpaid leave of absence is mandatory.

The grant is not compatible with other kinds of fellowships, except for those awarded with the aim of integrating the training or research activity of the fellowship holder with a period spent abroad.

Incomes from working activities, also part-time, carried out continuously are not allowed. On the contrary, limited self-employed occasional work is compatible with the grant, only if it does not affect the research activity and must be authorized in advance by the Director of INAF- Osservatorio Astronomico di Roma.

Retired persons are not eligible for Research fellowship.

Applications are not accepted from candidates who carried out research fellowships under article 22 of Italian Law 240/2010 and integrative for a total period indicated in the current law, including extensions, but excluding the concurrent periods of doctoral studies up to the legal duration of the course and excluding periods of maternity leave or sick leave, in accordance with current legislation. When formally accepting the grant, the successful candidate will provide a declaration of absence of inadmissible conditions.

Art. 5 – Duration of the Research grant

The expected starting date of the fellowship is from 1° March 2022 on, negotiable. Its duration is expected to be 1 year contingent upon successful evaluation of the results achieved in the first year, with possible extension up to six years depending on funding availability, and in any case within the limits of Article 22 paragraph 3 of Law 240/2010 and subsequent amendments.

Art. 6 – Host Institution

The host institution of the grant is INAF-Osservatorio Astronomico di Roma. The successful candidate will have to travel on duty abroad.

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Art. 7 – Salary amount

The annual gross salary of the grant is **28.000,00 (twenty-eight thousand) Euros** to be paid in deferred monthly payments. This amount does not include the burdens paid by INAF-Osservatorio Astronomico di Roma.

Applicable tax regulations are stated art. n. 4 of Italian law n. 476/1984 and subsequent modifications and integrations. Applicable social security rules are stated in art. n. 2, paragraph 26 and following paragraphs of the Italian law n. 335/1995 and subsequent modifications and integrations. Applicable regulations for mandatory maternity leave are provided in the Decree of the Ministry of Labour and Social Security dated 12 July 2007, published in the "Gazzetta Ufficiale" n. 247 dated 23 October 2007. Applicable regulations for sick leave are provided in art. n. 1, paragraph n. 788 of Italian law n. 296 dated 27 December 2006 and subsequent modifications. During the period of mandatory maternity leave the allowance paid by INPS (the Italian National Institute for Social Security) according to art. n. 5 of the above-mentioned Decree dated 12 July 2007 is integrated by INAF up to the total amount of the grant. The period of mandatory maternity leave will not contribute to the duration of the grant.

As for third party liability, the grand holder will be covered by insurance policy at the expense of INAF. This will not cover the civil liability of the grant holder towards INAF.

The grant holder must pay at his/her own expensive an insurance policy against work related injuries.

Art. 8 – Selection Board and selection procedure

The selection of eligible candidates will be carried out by a Selection Board appointed by the Director of INAF-OAR.

The Selection Board is composed of 3 members, from both Italian and foreign research staff, including also University staff, with expertise in the research field of the position. According to the current regulation, the composition of the Selection Board should comply with gender balance. The president of the Selection Board is nominated in the appointment decree and is chosen among the Board members. The Selection Board Secretary is also appointed in the above-mentioned decree.

The selection is based on qualifications, possibly integrated with an interview. candidates must exhibit their identity documents in order to be admitted to the interview.

The Selection Committee can establish a short list of the eligible applicants to be interviewed, on the basis of qualifications and documented experience in scientific or technological activities concerning the specific subject of the research fellowship. All the activities of the selection

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procedure (e.g. meetings of the Selection Board, interviews…) can be carried out by using videoconference systems.

Applicants selected for the interview will be formally notified 15 days in advance by e-mail with acknowledgement of receipt, containing the individual evaluation score.

The selected candidates who miss the interview will be excluded from the competition.

If the measures for the containment and management of the COVID-19 epidemiological emergency persist, all the meetings of the Selection Board and the qualification-based selection can be carried out electronically, for all or some of the Board members, in compliance with the principles set by article 247, paragraph 7, of Italian Law 34/2020, and in case of interview, this can be carried out through conference call, for all or some of the Board members, according to the procedures set by article 247, paragraph 3, of Italian Law 34/2020.

The qualifications that can be assessed are the following:

a) publications of a technical-scientific nature relating to the sector for which the competition is competing or similar sectors (for a maximum of 15 out of 60 points);

b) curriculum vitae et studiorum (for a maximum of 35 out of 60 points);

c) other qualifications that can be evaluated (for example, if requested in the call for applications, preferential qualifications for a maximum of 10 out of 60 points).

The total ranking score is 100 points, of which 60 points is the maximum score for qualifications and 40 points is the maximum score for the interview. The minimum score in order to access the possible interview is 42/60.

The candidates who obtain, in the same test, a score of at least 28/40 will pass the oral examination.

At the end of the selection process the selection board will draw up a ranked list based on the sum of the scores obtained both in the qualifications evaluation and the interview.

For candidates with the same score on the ranked list, preference will be given to the younger candidate.

The approval decree of the selection procedure and the ranked list will be published on the following website:

https://www.oa-roma.inaf.it/blog/category/bandi-di-concorso/

Art. 9 – Awarding of the fellowship

The highest ranked candidate will receive written notification of award of the research fellowship.

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Within 10 days from receipt of the formal notification of the award he/she must provide a formal declaration of acceptance of the research grant. The declaration will also state that he/she is not subject to any of the exclusion conditions listed in article 4 of this Call.

If the candidate does not provide declaration of acceptance within a time limit of 10 days, he/she will lose his/her entitlement to the research fellowship that is automatically awarded to the next ranked candidate.

Under no circumstances the signing of the contract establishes a subordinate employment relationship or ensures any rights to access to permanent INAF staff positions.

Art. 10 – Fellowship obligations

The holder of the fellowship:

• will start the research activity at INAF-OAR on the date indicated in the contract, unless prevented by exceptional circumstances, of which the Director of INAF-OAR must be timely informed;

• will carry out his/her research activities under the supervision of the scientist in charge of the projects, Dr. Lucio Angelo Antonelli;

• is required to issue an activity report every 12 months. The activity reports will be subject to approval from the scientist in charge of the project and will be transmitted to the Director of INAF - OAR.

Approval failure, properly explained by the supervisor, will give INAF- OAR the right to withdraw the contract;

• is required to send a written note in case of withdrawal, with at least 30 days' notice, otherwise INAF-OAR is entitled to retain or request the reimbursement of the salary amount corresponding to the missed notice period.

The holder of the fellowship who does not carry out his/her research activity regularly without justifications, or repeatedly fails to fulfill the requirements or, according to the supervisor, dr. Brunella Nisini shows evident lack of skills with the planned research activities, will incur the withdrawal of the contract.

Temporary suspensions of the research fellowship are due in case of mandatory maternity leave or in case of illness periods exceeding one month or of any other serious reasons. The reasons for suspending the research fellowship must be proved and certified, and promptly sent to the Director of INAF-OAR.

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Art. 11 – Applicable regulation

The INAF-OAR shall comply with the current regulations promoting equal opportunities for women and men, non-discrimination and respect for privacy in processing personal data.

As for the cases not mentioned in this call, INAF-OAR shall act in compliance with the current regulations concerning Italian public selection procedures.

Art. 12 – Final provisions

Any information regarding the present call could be request by sending an e-mail to the following address: danilo.antonelli@inaf.it.

The Director

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ANNEX 1

APPLICATION FORM

To the Direction of INAF-Osservatorio Astronomico di Roma

Via Frascati 33

00078 Monte Porzio Catone (RM)

I, THE UNDERSIGNED,

(Forename(s))…………………………… Surname)……………………………………………

Place of birth (City/State/Country) ……………………………….

Date of birth (dd/mm/yy) …………………………..

Nationality ……………………………

Permanent residence address (number/street/town/postal code/Country:

………………………………………………………………………………………………………

Email address: …………………….

agree to the processing of my personal data, in accordance with Italian Leg. Decree n. 196/2003, for the purposes of the present selection procedure.

I, THE UNDERSIGNED,

having read the Call for applications D.D …. for the appointment of one research fellowship entitled: "Development and optimization of algorithms with Machine Learning techniques for reduction and analysis of data from astronomical instruments with particular regard to images produced with Cherenkov telescopes"

request

to apply for the above mentioned fellowship, and to this end, aware that false declarations are punishable by law and that this Administration will carry out random checks on the accuracy of the declarations made by candidates,

declare

under my own responsibility

- that I hold the following Research Doctorate (PhD) ……………………………… awarded by…………………………………………………………………… on date……………… Title of thesis……………………………………………………………………………………………;
- that I hold the following educational qualifications………………………………………………………, awarded by……………………………………Date(dd/mm/yy)………………………………….;
- that I have professional knowledge of the English language;
- that I have ……. years of documented experience in scientific or technological activities;
- that I am aware of the restrictions described in Article 4, of the Call for applications for this research fellowship;
- that I have never received a research award as per art. 22, Italian Law 240/2010;
- that I have previously received a research awards as per art. 22, Italian Law 240/2010 and, in particular I have been the recipient of[1]:
  a research fellowship entitled ……………………………………………….…………………………,
  at (name of the institution)……………………………………………………………………………….,
  beginning………….………ending………….…………total months …………………..
  a research fellowship entitled ……………………………………………………………………………,
  at (name of the institution)…………………………………………………………………………………,
  beginning……….…………ending………….…………total months ……………..
  a research fellowship entitled ……………………………………………….…………………………,
  at (name of the institution)……………………………………………………………………………….,
  beginning………….………ending………….………..…total months …………………..
- that I am not a retired person;
- that I am aware that, under art. 22 Italian Law 240/2010, the research fellowship:
  cannot be held contemporary with attendance at academic courses, "laurea specialistica" academic courses, and "laurea magistrale" academic courses, as well as with attendance at Ph. D courses with fellowship; cannot be held contemporary with other fellowships of whatever kind, except those awarded with the aim of integrating the training or research activity of the fellowship holder through a period spent abroad;cannot permit aggregation of income from working activities, also part-time, carried out continuously.

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[1] Indicate the number of months for which the award was used and the name of the institution granting the award. Please provide details of each award, for example, if you have had two awards of 24 months each at the same institution indicate these as two separate awards on two different lines.

o that I wish to receive any communication relating to the selection at the following address and that I will give due notice of any change of address:

Address (number/street/city /postal ode/Country):

Email address: ………………………………………………

I attach to this form:

1. Annex 2 "Certification - Declaration in lieu of affidavit (Art. 19 - 46-47 the DPR 28th December 2000, n. 445)";
2. "Curriculum vitae", signed and dated by the applicant including a list, if applicable, of grants and fellowships held in the past or in progress;
3. copy of a valid identity document (ID card or passport);
4. list of publications;
5. Statement of research interests and qualifications;
6. List of any other title deemed relevant for the application;
7. The list of all the submitted documents.

Place ………… Date……..…..

_____

Signature (not authenticated)

ANNEX 2
Certification and Self-Declaration in lieu of affidavit

(Art. 19 - 46-47 the DPR 28th December 2000, n. 445)

DICHIARAZIONE SOSTITUTIVA DI CERTIFICAZIONE
DICHIARAZIONE SOSTITUTIVA DI ATTO DI NOTORETÀ
(Art. 19 – 46 – 47 del D.P.R. 28 Dicembre 2000, n. 445)

I, the undersigned,

(Forename(s))…………………………… Surname)…………………………………………
Place of birth (City/State/Country) ……………………………….
Date of birth (dd/mm/yy) …………………………..
Nationality ……………………………
Permanent residence address (number/street/town/postal code/Country:
………………………………………………………………………………………………
Email address: ……………………..

aware that false declarations are punishable by law and that this Administration will carry out random checks on the accuracy of the declarations made by candidates

self-declare

- that the content of the attached "curriculum vitae" is true

- That the documentation produced in copy is in compliance with the original

…...

…..

Place …………....   Date……………..

Signature (not authenticated)*

the photocopy of a valid identity document of the signer must be attached