Call for expression of interest for one (1) Ph.D. student fellowship position "Weak Lensing Mass Mapping" at the Institute of Computer Science (ICS) Foundation for Research and Technology – Hellas (FORTH)

Position: One (1) position for the HORIZON project TITAN
Project: “TITAN – Frugal Artificial Intelligence and Application in Astrophysics” (Grant Agreement number: 101086741) funded under HORIZON-WIDERA-2022-TALENTS-01
Desired starting date: September 1st, 2023
Duration: 1 year with yearly extensions for the duration of the Ph.D.
Fellowship stipend: approximately 1.400 euros/month (net)
Location: Heraklion, Crete, Greece
Opening date: 11/4/2023
Closing date: 02/05/2023
Ref.: “TITAN-Ph.D. studentWeak”

Description. Weak gravitational lensing is one of the most promising tools of cosmology offering insights into the evolution of dark-matter structures, as well as helping distinguish between dark energy and models of modified gravity through the generation of two-dimensional mass maps. While small-field mass maps have been frequently used to study the structure and mass distribution of galaxy clusters, wide-field maps have only recently become possible given the broad observing strategies of surveys like CFHTLenS, HSC, DES, UNIONS, and KiDS.

Standard methods for deriving mass maps from weak-lensing observations (e.g. Kaiser & Squires) require smoothing which leads to small-scale information loss, while alternative versions (e.g. GLIMPSE/MCALens) based on sparse reconstruction address some of these issues. In the past few years, promising mass map recovery techniques have emerged exploiting (deep) machine learning.
Within this project, we seek one PhD student who will develop novel data-driven approaches for the robust reconstruction of weak-lensing mass maps in different redshift bins, which will offer uncertainty quantification, as well as the extension of these methods to the sphere. Emphasis will be given to the analysis of large-scale datasets, including ones acquired by the Euclid satellite, to be launched in 2023, which will observe the sky in the optical and infrared. The goal is to be able to map large-scale structures and weak-lensing distortions out to high redshifts, targeting the reconstruction of dark matter mass maps over 15000 square degrees.

The doctoral student will be located at the premises of FORTH with a strong collaboration with the CosmoStat Laboratory at CEA Saclay. The doctoral student will be supervised by Jean-Luc Starck (FORTH/CEA), Panagiotis Tsakalides (FORTH), and Martin Kilbinger (CEA, France)

**Required qualifications:**
- BSc and MSc in Physics, Computer Science, or a related field
- Good Knowledge of English
- Willingness and ability to work cooperatively within a team, to learn, and to adapt to the project
- Physical presence at FORTH, Heraklion, Crete for the duration of the position

**Desired qualifications:**
- Experience with the analysis of weak lensing data
- Experience with Euclid simulation data

**Application Submission**
Interested candidates can submit their applications via [http://www.ics.forth.gr/jobs/en/](http://www.ics.forth.gr/jobs/en/) using the link “Apply for the position” under the announcement. Applications must include:
- Detailed CV, including qualifications and interests in the above areas and proof thereof
- Scanned copies of academic titles; academic transcripts for undergraduate and postgraduate degrees
- Letters of recommendation, detailed presentation of prior work, studies and/or publications, demonstrating knowledge of desired skills.

**Contact Information:**
For information and questions about the advertised position, the activity of the group or the Institute, please contact Jean-Luc Starck at jstarck@cea.fr and Panagiotis Tsakalides at tsakalid@ics.forth.gr.

**Selection procedure**
Applications will be evaluated by a 3-member committee headed by the ERA Chair, Dr. J-L. Starck, and they will be screened by the TITAN international scientific advisory board. In the case candidates are invited for an interview, they will either be invited to participate in person or via teleconference. Beyond scientific excellence, selection criteria will include gender and diversity aspects as well as complementary skills and fit of the candidate to the existing team.

**Selection Announcement**
The result of the selection will be announced on the website of ICS-FORTH. Candidates have the right to appeal the selection decision, by addressing their written objection to the ICS secretariat within five (5) days since the results announcement on the web. They also have the right to access (a) the files of the candidates as well as (b) the table of candidates’ scores (ranking of candidates results). All the above information related to the selection procedure will be available at the secretariat of ICS-FORTH in line with the Hellenic Data Protection Authority. Access to personal data of co-candidates shall be limited to personal data (and relevant data) and supporting documents which have been the basis of the evaluation of the candidates for the specific post(s). Prior to the announcement of the personal data and/or documents of the co-candidates to the applicant, FORTH will inform the data subjects in an appropriate way.
Disclaimer

FORTH is compliant with all legal procedures for the processing of personal data as defined by the Regulation EU/2016/679 on the protection of natural persons with regard to the processing of personal data.

FORTH processes the personal data and relevant supporting documents that you have submitted to us. Processing of that data is carried out exclusively for the needs and purposes of this specific call. Such data shall not be transmitted to or communicated to any third party unless required by law.

FORTH retains the above data up to the announcement of the final results of the call, unless further process and reservation is required by law or for purposes of exercise, enforcement, prosecution of certain one’s legitimate legal rights’ as defined in the Regulation EU/2016/679 and/or in national law.

We inform you that under the Regulation EU/2016/679 you have the rights to be informed about your personal data, access to, rectification and erasure, restrictions of process and objection to as provided by applicable regulation and national laws.

We acknowledge also to you, that you have the right to file a complaint to the national Data Protection Authority. For any further information regarding exercise of your personal data protection rights, you may contact the Data Protection Officer at FORTH at dpo@admin.forth.gr.

You have the right to withdraw your application and consent for the processing of your personal data at any time. We inform you that, in this case, FORTH shall destroy such documents and/or supporting documents submitted and shall delete the related personal data.