

## «Ph.D.-Position in Computer Vision / Deep Learning applied to Facial Analysis in invisible spectra » (M/F)

Research field: Facial Analysis in invisible spectra  
Project-team: STARS, Inria Sophia Antipolis  
Collaboration: The Ph.D. thesis will be conducted in collaboration with Gemalto, France

### About Inria and the team

Inria, the French National Institute for computer science and applied mathematics, promotes “scientific excellence for technology transfer and society”. Graduates from the world’s top universities, Inria’s 2,700 employees rise to the challenges of digital sciences. With its open, agile model, Inria is able to explore original approaches with its partners in industry and academia and provide an efficient response to the multidisciplinary and application challenges of the digital transformation. Inria is the source of many innovations that add value and create jobs.

### Team

The STARS research team combines advanced theory with cutting edge practice focusing on cognitive vision systems.

#### Team web site

<https://team.inria.fr/stars/>

### Mission

The Ph.D. position is within the framework of the national project SafeCity: Security of Smart Cities. The goal of the Ph.D. will be to analyze faces, i.e., perform face recognition, as well as event recognition in the invisible spectra.

- **Deadline for applications:** 30/09/2018. Nevertheless, the application may be closed before the deadline, if a satisfying candidate is found
- **Duration:** 3 years
- **Domain:** Computer vision, image processing, biometrics
- **Location:** Inria Sophia Antipolis



## Job description

The Inria STARS team is seeking for a Ph.D. researcher with strong background in computer vision, biometrics, deep learning and machine learning.

The candidate is expected to conduct research related to:

1. Exploring **facial analysis in the invisible spectrum**. Among the different spectra low energy infrared waves, as well as ultraviolet waves will be studied. In this context following tasks will be included:
  - a) Acquisition of images in the invisible spectrum and processing of such data.
  - b) Model design to extract biometric features from the acquired data.
  - c) Analysis of the data related to contours, shape, etc. will be performed. Current methodology cannot be adopted, since colorimetry in the invisible spectrum is more restricted with less diffuse variations and is less nuanced.
  - d) Facial recognition in the invisible spectrum. Expected challenges have to do with limited colorimetry and lower contrasts.

In addition to the first milestone (face recognition in the invisible spectrum), there are two other major milestones:

2. **Implementation of such a face recognition system**, to be tested at the passage of the access portal to a school.
3. **Pseudo-anonymized identification** within a school (outdoor courtyards, interior buildings). Combining biometrics in the invisible spectra and anonymisation within an established group requires removing certain additional barriers that are specific to biometrics but also the use of statistical methods associated with biometrics. This pseudo-anonymized identification must also incorporate elements of information provided by the proposed electronic school IDs.

Additional goals of the Ph.D. include:

- Demonstration of universality and uniqueness of faces in the invisible spectrum,
- Development of a registration process, which captures biometric data in the invisible spectrum, processes it to transform it into templates, which will form the gallery.
- Matching of gallery and probe images adapted to the invisible spectrum.

These above described three goals are the keystone of a biometric solution that can be used in a school ecosystem.

## Skills and profile

Candidates must hold a Masters degree or equivalent in Computer Science or a closely related discipline by the start date.

The candidate must be grounded in the basics of computer vision, have solid mathematical and programming skills (knowledge of Matlab/Python, C++, Linux and Deep Learning packages like Torch/Theano/TensorFlow is preferable).

The candidate must be committed to scientific research and strong publications.

## Advantages

- Inria Sophia Antipolis is ideally located in the heart of the French Riviera, inside the multi-cultural silicon valley of Europe
- Competitive salary (approximately 1980 Euros brut per month)
- Strong medical and social benefits
- Restaurant on site



- Financial participation for public transport
- Social and sporting activities
- French courses

#### Additional Information

- Duration: 3 years
- Targeted hiring date: September 2018
- Location: Inria Sophia Antipolis, France
- Collaboration: Gemalto, France (<https://www.gemalto.com/france/>)
- Gross Salary per month: 1980€brut per month

#### Application

To apply, please email the following documents to Antitza Dantcheva ([antitza.dantcheva@inria.fr](mailto:antitza.dantcheva@inria.fr)), indicating "Gemalto – Ph.D." in the e-mail subject line.

- Motivation letter
- CV
- Contact information for at least two references, who can provide recommendation letters upon request.

The submission deadline is 30<sup>th</sup> of September 2018. Nevertheless, the application may be closed before the limit date, if a satisfying candidate is found.

Please do not hesitate to contact us for any inquiry.

***Inria's disabilities policy: All positions at the institute are open to disabled people.***

#### Security and defense procedure

In the interests of protecting its scientific and technological assets, Inria is a restricted-access establishment. Consequently, it follows special regulations for welcoming any person who wishes to work with the institute. The final acceptance of each candidate thus depends on applying this security and defense procedure.