

Position description

1. Position identification

Title of post : Post-doctoral researcher InSpeGMos

Type of contract : Post-doctoral contract

Category (A,B or C) : A

Contract/project period : 2024-2025, renewable for 1 additional year

Expected date of employment : September 1st, 2024 or later (negotiable)

Proportion of work : Full time

Workplace : Institut de Recherche Mathématique Avancée, Analysis group, Université de Strasbourg

Desired level of education : PhD

Experience required : Recent PhD (less than 4 years)

Contact(s) for information on the position (identity, position, e-mail address, telephone) : Nalini Anantharaman, Professor, anantharaman@math.unistra.fr

Date of publication : April 5th 2024

Closing date for the receipt of applications : June 7th 2024

2. Research project or operation

- The project Integrating Spectral and Geometric data on Moduli Spaces (**InSpeGMoS**) has been awarded an **Advanced ERC Grant** by the European Commission for the period 2023-2028. This funding will allow to hire several post-doc researchers and PhD students, and in particular applications are open for a two-year post-doctoral position for 2024/26.
- See <https://irma.math.unistra.fr/~anantharaman/inspegmos.html>

3. Activities

➤ **Description of the research activities :**



- InSpeGMoS is focussed on the geometry and spectrum of random objects (specifically, hyperbolic surfaces and discrete graphs). The central object of study is the Weil-Petersson measure on the moduli space of compact hyperbolic surfaces. The overall goal is to develop new integration techniques that will allow to study geometric and spectral data of random hyperbolic surfaces, with an aim to establishing limit theorems. The project involves various branches of mathematics (geometry, probability, analysis, spectral theory...) We welcome applicants with various backgrounds, provided they are willing to learn other topics.

The tasks will be adapted to the post-doctoral researcher's prior knowledge of the subject.

One privileged direction of research will be to study the spectral gap for various models of random

hyperbolic surfaces in the large genus limit, particularly the random cover model. Another possible

direction is to study the statistics of periodic geodesic lengths in fixed genus.

- **Related activities :** the position comes with no teaching load. The mathematics department in Strasbourg is always in need of teachers, and the selected postdoc can apply for teaching assignments, if approved by the employer. Such a teaching is paid extra and is fully optional. Classes are usually given in French.
- The post-doctoral researcher will be asked to present the research results in conferences, to help with the guidance of the research of the PhD students associated with the project, to help with the organization of the Analysis seminar at IRMA, and to participate in the organization of an international workshop.

4. Skills

- **Qualifications/knowledge :** We will particularly appreciate applicants with a strong background in Teichmüller theory / hyperbolic geometry / spectral geometry / random geometry / random graphs models and random matrix models.
- **Operational skills/expertise :** The post-doctoral researcher will be asked to create and maintain a basic web-page for the project.

- **Personal qualities :** curiosity, strong motivation for research, ability to learn new subjects. Ability to work in group. Skills for written and oral presentation of research results.

5. Environment and context of work

- **Presentation of the laboratory/unity :** The project will be carried out in one of the France's best Mathematics lab, IRMA (Institut de Recherche Mathématique Avancée). The department has world-leading research groups in mathematical physics, complex and symplectic geometry and Teichmüller theory. The permanent staff in Strasbourg whose research interfaces with the theme of this proposal are O. Guichard, F. Guéritaud, A. Papadopoulos (Teichmüller and higher Teichmüller theory, hyperbolic geometry), A. Oancea, M. Sandon, E. Opshtein (symplectic geometry), V. Fock, S. Klevtsov (mathematical physics), X. Zeng, V. Limic (random graphs, spectra of random Schrödinger operators, stochastics). This existing high-level research environment will be complemented by an international visitors programme to maintain and stimulate collaboration with external experts.
- **Hierarchical relationship :** Nalini Anantharaman is the PI of the project. The postdoctoral will be a member of the lab IRMA, currently directed by Charles Frances.

To apply, please write to :

anantharaman@math.unistra.fr with the subject *InSpegMos post-doc*.

Please send a CV (2 p. Maximum), a list of publications, a research statement (2-7 pages) and a cover letter. The cover letter should contain the proposed dates for the postdoctoral contract, and the contact details of three scholars who could be contacted for reference purposes, if needed.