Ingenieurs01548 - R&D engineer for interactive visualization project (H/F)

Level of qualifications required: Graduate degree or equivalent
Fonction: Temporary scientific engineer
Level of experience: From 3 to 5 years

About Inria

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.

About the research centre or Inria department

Located at the heart of the main national research and higher education cluster, member of the Université Paris Saclay, a major actor in the French Investments for the Future Programme (Idex, LabEx, IRT, Equipex) and partner of the main establishments present on the plateau, the centre is particularly active in three major areas: data and knowledge; safety, security and reliability; modelling, simulation and optimisation (with priority given to energy).

The 450 researchers and engineers from Inria and its partners who work in the research centre's 31 teams, the 100 research support staff members, the high-level equipment at their disposal (image walls, high-performance computing clusters, sensor networks), and the privileged relationships with prestigious industrial partners, all make Inria Saclay Île-de-France a key research centre in the local landscape and one that is oriented towards Europe and the world.

Context

Established in 1967, Inria is the only public research body fully dedicated to computational sciences.

Combining computer sciences with mathematics, Inria's 3,500 researchers strive to invent the digital technologies of the future. Educated at leading international universities, they creatively integrate basic research with applied research and dedicate themselves to solving real problems, collaborating with the main players in public and private research in France and abroad and transferring the fruits of their work to innovative companies.

The 172 project-teams are distributed in eight research centers located throughout France.

Project-team ILDA, at Inria Saclay – Île-de-France near Paris, specializes in the design, development and evaluation of advanced interactive visualization systems to help domain experts understand and manipulate large amounts of data.

Assignment

The goal of this project is to develop a new software application called Seawall for the interactive visualization of tsunami simulations on ultra-high-resolution wall-sized displays. The project is a collaboration between three partners: team Lemon at Inria Sophia Antipolis – Méditerranée located in Montpellier, project-team ILDA at Inria Saclay – Île-de-France, and Inria Chile, in Santiago de Chile.

Seawall will be based on an existing prototype called TsunamiLab, a demo of which can be seen at http://tsunamilab.inria.cl. TsunamiLab is an educational Web-based platform enabling the simulation and visualization of tsunamis, that runs on desktop computers and portable devices such as tablets and smartphones. Seawall aims at extending TsunamiLab so as to make it able to run on cluster-driven ultra-high-resolution wall-sized display platforms such as those set up at Inria Saclay and Inria Chile, and make it more interactive so as to enable users to perform more elaborate visualization-driven tasks with it.

Main activities

- TsunamiLab is an educational Web-based platform enabling the simulation and visualization of tsunamis, that runs on desktop computers and portable devices such as tablets and smartphones. Seawall aims at extending TsunamiLab so as to make it able to run on cluster-driven ultra-high-resolution wall-sized display platforms such as those set up at Inria Saclay and Inria Chile, and make it more interactive so as to enable users to perform more elaborate visualization-driven tasks with it.
As part of its research in the field of data visualisation, project-team ILDA conducts research and development projects about the design, engineering and evaluation of interactive visualization techniques for ultra-high-resolution wall-sized displays. This type of display features a very high pixel density over a large physical surface. For instance, the first wall display set up at Inria Saclay, has a total resolution of $20,480 \times 6,400 = 131$ megapixels for a surface area of $5.5m \times 1.8m$.

Using existing frameworks for distributing data and graphics rendering across the computers of wall display clusters, such as, e.g., the SAGE2 framework, the recruited engineer will be in charge of porting TsunamiLab so that it can run on such wall displays. The main activities include:

- Integration of Cesium.js (an open-source javascript virtual globe for the development of geovisualization applications) and TsunamiLab with SAGE2. A proof of concept of this integration has already been prototyped at Inria, to demonstrate the feasibility of the approach.
- Develop different visualization modes that can advantage of the high display capacity of ultra-high-resolution wall displays.
- Developing a user input manager that can interpret events from devices typically used when interacting with wall displays, beyond the keyboard and mouse, such as smartphones, tablets, motion tracking systems.
- Working in collaboration with members of team Lemon to enhance the tsunami simulation code so that it can support higher-resolution models and data.

**Skills**

Candidates should have prior experience with Web-based technologies.

Required skills:

- Software engineering skills (version control with svn or git, unit tests, documentation, etc.)
- Good knowledge of Javascript
- Web-based data formats (JSON, XML, etc.)
- The candidate should speak English, or Spanish, as the work will be conducted in collaboration with Inria Chile.

Optional skills:

- js
- WebGL
- Prior experience with SAGE2
- Prior experience with Cesium.js

**Benefits package**

- Subsidised catering service
- Partially-reimbursed public transport
- Social security
- Paid leave
- Flexible working hours
- Sports facilities

**Remuneration**

Salary : in regards to experiences and diplomas