

**DESCRIPTION OF RESEARCH ENGINEER
TEMPORARY POSITION
TEAMPLAY PROJECT**

<i>Research Domains: security, programming languages, software engineering</i>	<i>Research project: TAMIS team / H2020 TeamPlay project</i>
<p>POSITION TITLE</p> <p>Researcher Engineer (<i>Ingénieur de recherche</i>) in computer science for the TeamPlay European project</p>	
Name of hierarchical leader, in charge of the TAMIS team : Axel LEGAY Name of functional leader, coordinator du TeamPlay project: Olivier ZENDRA	Duration of the contract: From 01/01/2018 to 31/12/2020.
<p><u>Inria</u></p> <p>Created in 1967, 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 2,600 employees rise to the challenges of digital sciences. Research at Inria is organised in “project teams” which bring together researchers with complementary skills to focus on specific scientific projects. With this 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. The source of many innovations that add value and create jobs, Inria transfers expertise and research results to companies (startups, SMEs and major groups) in fields as diverse as healthcare, transport, energy, communications, security and privacy protection, smart cities and the factory of the future.</p> <p><u>TAMIS (Threat Analysis and Mitigation for Information Security) project-team</u></p> <p>Systems security requires both formal and engineering techniques to assess or even secure systems. Modern systems are networked, use virtual machines to improve security and handle multiple applications concurrently on the same hardware, which is often enhanced to with hardware security modules. The resulting complexity is typically far beyond what formal verification techniques can manage. On the other hand, merely applying engineering techniques to build secure systems has consistently resulted in deployments riddled with significant vulnerabilities. TAMIS’ central goal is thus to demonstrably narrow the gap between the vulnerabilities found using formal verification and the issues found using systems engineering. Type theory is a representative example where formal verification and software engineering are combined, as in type theory formal methods are</p>	

used to formally prove the absence of certain classes of bugs. However, it is not the case that the entire system is shown to be formally correct with respect to a more comprehensive specification, which requires software engineering effort to handle classes of bugs not captured by the type system. In the next four years, we aim at creating tool chains that combine statistical model checking, abstract interpretation, supervised execution and manual annotations to efficiently check interesting security properties of realistic systems that were previously not efficiently checkable. We will establish a strong connection with industry and with international teams recognized in this area.

TeamPlay project

The work will occur in the context of the TeamPlay (Time, Energy and security Analysis for Multi/Many-core heterogeneous PLAtforms) project that is funded from early 2018 till end 2020 by the European Union. This project federates 6 academic and 5 industrial partners and aims to develop new, formally-motivated, techniques that will allow execution time, energy usage, security, and other important non-functional properties of parallel software to be treated effectively, and as first- class citizens. We will build this into a toolbox for developing highly parallel software for low-energy systems, as required by the internet of things, cyber-physical systems etc. The TeamPlay approach will allow programs to reflect directly on their own time, energy consumption, security, etc., as well as enabling the developer to reason about both the functional and the non-functional properties of their software at the source code level.

Our success will ensure significant progress on a pressing problem of major industrial importance: how to effectively manage energy consumption for parallel systems while maintaining the right balance with other important software metrics, including time, security etc. The project brings together leading industrial and academic experts in parallelism, energy modeling/ transparency, worst-case execution time analysis, non-functional property analysis, compilation, security, and task coordination. Results will be evaluated using industrial use cases taken from the computer vision, satellites, flying drones, medical and cyber security domains.

Within TeamPlay, Inria and TAMIS coordinate the whole project, while being also in charge of aspects related more specifically to security.

Missions

Under supervision of the scientists in charge of the TAMIS team at Inria Rennes and of the European TeamPlay project, the research engineer shall mainly contribute to the project technical coordination and to the research work pertaining to the non-functional property of security. She/he shall interact with the local scientists and engineers as well as the other international partners in the project.

Position description (activities)

Main: research and development for security in TeamPlay:

- Participate to the research on expressing the security and energy non-functional properties, as per the project.
- Participate to the technical applicative coordination of the project
- Integrate to the project toolchain the models and tools developed in TAMIS
- Produce internal and external technical documentations

- Participate in the publication of TAMIS results in TeamPlay

Additional: participate to project demonstrations locally and abroad

Profile wanted (expected competences and qualifications)

Core/mandatory:

- PhD or engineer degree in computer science or software engineering
- Dynamism, willingness to take initiative
- Software engineering (design, development, debugging, documentation)
- Formal methods, modeling
- Taste for research, cyber security
- Team spirit
- Ability to meet deadlines and have them met
- Good writing skills
- Good level in written and spoken English

Additional/welcome:

- Experience in management
- Experience in research

Work conditions

- Salary based on experience, full benefits
- Subsidized cafeteria in the premises, subsidized meals outside
- Social committee subsidizing various activities
- Public transportation (subsidized 50%) 400m from the premises
- Large free parking lots around the premises

Work location:

Research Center Inria Rennes - Bretagne Atlantique
Allée Jean Perrin, Campus universitaire de Beaulieu. Rennes. France.

Contact :

Olivier ZENDRA,
Inria Rennes - Bretagne Atlantique
Campus universitaire de Beaulieu. 35042 Rennes Cedex, FRANCE
Email: Olivier.Zendra@inria.fr
Tel: + 33 299 847 552