

Postdoctoral Position

(in the context of the ANR project GEMOC)

Title	A Language Workbench for Heterogeneous Modeling and Simulation <i>Model Driven Engineering, Heterogeneous Modeling, Model Execution and Simulation, Language Design and Implementation</i>
Workplace	Inria Rennes - Bretagne Atlantique University of Rennes 1, Campus de Beaulieu, 35000 Rennes, France
Field	Software engineering
Team	Triskell (IRISA and Inria)
Duration	24 months
Date	Early 2013
Salary	~ 3000 Euros (before tax), depending on experiences
Diploma required	Ph.D. in computer science (especially in software engineering such as model driven engineering, language theory, concurrency theory, and/or formal methods)
Environment	<p>The candidate will work at Inria in the Triskell team. Inria is the French national institute for research in computer science. There are 8 Inria research centres located throughout France, hosting more than 200 research teams. The Triskell team is located in Rennes. Triskell's research is in the area of software engineering, focusing on model-driven engineering and software testing. The team is actively involved in European, French and industrial projects and is composed of 7 faculty members, 20 PhD students and 4 engineers.</p> <p>The candidate will work in the context of the ANR project GEMOC (INS Program, 2012-2016), leads by the Triskell team</p>
Context	<p>The project GEMOC (see http://gemoc.org/ins) includes various academic and industrial partners (Inria, I3S IRIT, ENSTA, Thales and Obeo) and aims at providing a language framework for heterogeneous model execution and dynamic analysis in the context of complex software intensive systems.</p> <p>GEMOC focuses on three design and simulation issues that must be handled effectively for the construction of complex systems:</p> <ol style="list-style-type: none"> 1- Consider various concerns. Multiple stakeholders are involved in the design process, each with a specific domain expertise. Stakeholders express their perspective with their own language, which then must be composed for global analysis. 2- Integrate heterogeneous parts. Complex systems integrate different devices specialized for different applications to deliver a global service. Thus, communication, synchronization must be modeled to compose heterogeneous parts and characterize the emerging behavior. 3- Deal with evolution and openness. It is not possible to establish an exhaustive, finite list of domain languages, communication and timing models. Thus, tools and environments must be open and allow the evolution or the creation of domain languages and communication models. <p>GEMOC has the ambition to propose an innovative environment for the design of complex software-intensive systems by providing (i) a formal framework that integrates state-of-the-art MDE (<i>Model Driven Engineering</i>) and MoCC (<i>Model of Computation and Communication</i>) to reason over the composition of heterogeneous concerns; (ii) an open-source design and modeling environment associated to a well-defined method for the definition of DSMLs, MoCCs and rigorous composition of all concerns for simulation purposes.</p> <p>This requires addressing two major scientific issues in GEMOC: the design and verification of a formal framework to combine several different <i>domain-specific modeling languages</i> (DSMLs) relying on distinct <i>models of computation</i> (MoCCs); the design and validation of a methodology for DSMLs and MoCC development. GEMOC aims at participating in the development of next generation MDE environments through a rigorous, tool-supported process for the definition of executable DSMLs and the simulation of heterogeneous models. The GEMOC environment will be open-source and domain-independent, and based on a formal hierarchical model for the composition of models defined with different DSMLs, over heterogeneous MoCCs. The platform will be validated on industrial use cases representative of the expected usage of GEMOC.</p> <p>The GEMOC consortium gathers complementary expertise from the DSML and MoCC communities and benefits from the support of OPEES consortium for sustainable exploitation.</p>
Activity	<p>The candidate to the postdoctoral position will involve in the GEMOC project, working together with faculty members, PhD students, and software engineers.</p> <p>The candidate would participate to leverage on the Kermeta language workbench to provide a tool supported methodology that allow a DSML designer to modularly define a DSML from its model of computation, and to describe their composability. For this purpose, the models of computation should be defined so that they can be reused in the definition of different DSMLs using a precise architecture. Then, relying on the definition of the DSMLs, the tool should also provide a dedicated interface to control and animate the simulation of the domain-specific models and to capture and analyze temporal properties automatically. The platform will be validated on industrial use cases representative of the expected usage of GEMOC.</p>
Requirement and profile	<ul style="list-style-type: none"> - Strong skills in object-oriented development (highly skilled in Java) and associated tools (version and build manager, Eclipse, testing tools...). - A good knowledge of the model-driven engineering and practical experiences with Eclipse Modeling (e.g., EMF, EMF Text and/or xText, etc.) and Kermeta. - A established background in language design and implementation (textual/graphical editors, compiler, interpreter, and/or analysis tools). - The position requires autonomy, as well as excellent English speaking and writing skills.
How to apply	<p>Please send your application (PDF) as soon as possible. Screening of applications starts immediately and continues until the position is filled. Send cover letter including names of at least two referees, CV and PDFs of PhD dissertation (or draft) and up to three most relevant publications to Benoit Combemale benoit.combemale@irisa.fr and Benoit Baudry benoit.baudry@inria.fr.</p>