

UNITED NATIONS UNIVERSITY
VACANCY ANNOUNCEMENT
UNU-IIST

Positions are available at the United Nations University's International Institute for Software Technology¹ (UNU-IIST) in Macao for post-doctoral researchers, PhD students and fellows. UNU-IIST is a Research and Training Centre of the United Nations University whose mission is to help developing countries strengthen their education and research in computer science and their ability to produce computer software. It thus provides a unique setting with a proven record in the application of mathematical methods to the production of useful theories for practical problems and for training young researchers in Formal Methods and Theoretical Computer Science.

The positions are funded by UNU-IIST and the Macau Science and Technology Development Fund through "PEARL — Process Expansion: Action Refinement in the Large", a project run in collaboration with the University of Macau². The PEARL team includes Jeff Sanders, Xu Qiwen, Wang Xu, Yang Shaofa and Chris Ma.

The project concerns the top-down development of information systems. One convincing way to understand the complex systems that confront us daily in Computer Science is to specify their behaviour, abstracting implementation detail. But usually it is the implementations themselves that are of interest; for instance we may have just a specification and wish to find an implementation; or we may wish to understand, in greater detail than its specification, an existing implementation. By adopting the standard approach of Science, the top-down incremental method posits a series of designs, starting with the specification and ending with the implementation and having the property that each design conforms to its successor in the series.

More specifically we concentrate on distributed systems and topics broadly in:

1. developing 'grainless' semantic theories for concurrent systems, where coarse-grained actions can be refined into (subsystems of) fine-grained actions (or conversely);
2. exploiting the freedom of moving across levels of abstraction (i.e. grain

¹<http://www.iist.unu.edu>

²<http://www.umac.mo>

size) to develop scalable model-checking techniques and law-based incremental development methods;

3. application of the theories, techniques and methods to the verification and development of case studies including but not limited to concurrent non-blocking algorithms, multithreaded Java programs (with a weak-ordering memory model) and web-based transaction systems.

Because they involve aspects of Formal Methods (specification, refinement, semantics and automation) these projects provide excellent training for young Computer Scientists. Applicants are expected to have an interest in the rigorous analysis of information systems and to have an appropriate background.

The fellowship positions are intended for students from developing countries with a first degree, and often engaged in an MSc, but wishing to develop skills to enable them to embark on an academic career. The primary requirement is that over a nine-month period the fellow write a research paper under supervision of one of the members of the PEARL team.

The PhD and postdoctoral positions conform to international standards and are under the supervision of members of the PEARL team. In the former case affiliation is intended with one of UNU-IIST's university contacts, either in Macao or outside it. In the latter case there are opportunities for supervision of fellows and teaching short courses as the position is viewed, like the others, as a training one.

Salaries depend on experience and circumstances but are exempt from Macao tax. In terms of US dollars per month, postdoctoral positions lie in the range of 2,000–3,000, PhD positions lie in the range 800–1250 and fellowships are 800.

Further information about Macao can be found via Wikipedia, and about the positions, currently open, from

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