

Formal Analysis of Software Energy Consumption

PhD Thesis Proposal – 3-year Funding

October 12, 2016

Background As part of its IT research activities, *ICAM campus of Nantes* has undertaken studies on software energy consumption, its factors and impacts on software engineering in order to improve its energy efficiency. As such, ICAM has a platform for measuring energy software and for assessing measurement certainty.

This work will be carried out within the project MEASURE (<http://measure.softteam-rd.eu>) which aims at defining metrics-driven software engineering using novel metrics. Interesting collaborations could then be established with the different project partners.

Issue Currently, energy consumption measurements concern binary codes only and these measurements are performed during the software testing phase. This PhD thesis aims at developing a reliable method for estimating software energy consumption from their source codes. Requirements for software energy consumption could then be verified at earlier development phases.

Objectives The objective of this PhD thesis consists in developing a methodology in order to elaborate power models for all software components from energy consumption measurement results of some software only. This should be achieved by the means of formal methods or formal models to analyze the software components. Results of this PhD thesis (prototypes, publications, etc.) will be shared within the MEASURE project.

Supervising A co-supervising is planned between the University of Nantes and the Vrije Universiteit Amsterdam (VU Amsterdam).

- Patricia Lago (p.lago@vu.nl) supervisor,
- Nelly Condori-Fernandez (n.condori-fernandez@vu.nl) co-supervisor,
- Christian Attiogbé (christian.attiogbe@univ-nantes.fr) supervisor,
- Jerome Rocheteau (jerome.rocheteau@icam.fr) co-supervisor.

Profile We are looking for a dedicated student:

- Master degree in Computer Science,
- Good knowledge on formal methods,
- Experience on software testing is a plus,
- Programming, modelling skills,
- Writing and communication skills in English.