

Faculty Exchange Program Final Report

I. Personal Information:

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Position:	Assistant Professor
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II. Hosting department:

Department:	Institute for Software Research (ISR) / School of Computer Science (SCS)
Name:	David Garlan
Position:	Professor
E-mail:	garlan@cs.cmu.edu
Period of visit:	From 01-02-16 to 31-05-16

III. Work Plan (Activities and Objectives):

The main objective of this exchange period was to acquire competency in the software testing area, including both research and teaching.

Planned activities included:

1. Research collaboration with Prof. David Garlan in exploring the use of “continuous testing”, where a self-adaptive system can proactively test itself (along the lines of Chaos Monkey at Netflix) while the system runs. This work is build on the substantial research and development associated with Professor Garlan.
2. Creating a course on the foundations of software testing. Prof. Eduardo Miranda, who teaches a masters-level course named *Analysis of Software Artifacts* that covers testing as part of its content, and who is an expert in this area, was a great host and inspiration in that matter.
3. Interact with other researchers in the Institute for Software Research at CMU.

IV. Research-related Activities:

Work with Prof. David Garlan on software testing of self-adaptive systems.

1. A conference paper on Software Testing for Self-Adaptive Systems was submitted.
2. Attended the ABLE – Architecture Based Languages and Environments group research meetings.
3. Attended the SAM – Self Adaptive research meetings.
4. Attended the BRASS – Building Resource Adaptive Software Systems research meetings.
5. Attended the ISR PhD Software Research Seminars (SSSG).

All these meetings (most of them weekly) were very interesting to *feel* the way research work is done in Computer Science at Carnegie Mellon. They were also very useful to interact with the several researchers from ISR. It was very interesting to participate in meetings with people like Christian Kästner, Claire Le Goues, Jonathan Aldrich, Manuela Veloso, and Bradley Schmerl among many others.

V. Teaching-related Activities:

A course unit on the Foundations of Software Testing was designed and proposed to my home department for approval in several courses.

Attended the course *Analysis of Software Artifacts* from the Software Engineering Master Program, lectured by Prof. Eduardo Miranda.

Regular discussions with Prof. Eduardo Miranda about software testing and automatic grading of students assignments, and other topics related with teaching and quality assurance concepts.

VI. Other Lectures Attended:

Architectures for Software Systems from the Software Engineering Master Program, lectured by David Garlan, Anthony J. Lattanze, and Matthew Bass

Rick Kuhn (National Institute of Standards and Technology Gaithersburg. MD), “Combinatorial Methods in Software Testing”, Lecture at ISR, CMU, Feb 16, 2016

Rick Kuhn, “Combinatorial Methods and Oracle-free Testing”, Lecture at SEI, CMU, Feb 17, 2016

Joe Gibz Politz, “In-Flow Peer Review of Tests”, Lecture at GHC, CMU, March 1, 2016

VII. Conclusion:

The objectives stated in the work plan (above) were fulfilled as explained in each of the above sections.

All the stay was very productive in order to provide an overview and experience on software testing that will be very useful for me and my home university in the future. Hopefully the contacts will remain and the interaction between my department and CMU will continue to fructify in the future. Further scientific work with either Prof. David Garlan or Prof. Eduardo Miranda are the most expected in the near future.

For now this cooperation is already recompensing, Prof. Eduardo Miranda accepted my invitation to chair a track of the 10th International Conference on the Quality of Information and Communications Technology (QUATIC 2016) promoted by the IPQ/CS03 (Portuguese Institute for Quality / ICT Sectorial Commission). He will be in Portugal in September to attend the conference at UNL and then will visit some more Portuguese universities along the country.

Finally I have to thank all the CMU-Portugal staff for the opportunity and all the support provided.