

# QUEST: QUANTITATIVE EVALUATION OF SYSTEMS

## Organizational Structure Document

### 1. Background and Motivation

The analysis of complex systems involves verification, performance evaluation and dependability assessment. Each of these topics makes use of certain techniques that are unique to the particular type of analysis, but the topics benefit greatly from common ideas, and a continuous technical exchange.

The experience accumulated by many research groups, active in these fields, suggests that different (but complementary) formalisms and approaches are best suited to address these different aspects. However the number of results that have been developed for a specific research field and turned out to be very useful for improving the analysis of a different aspect of the behaviour of the same type of systems is becoming increasingly larger. Qualitative and quantitative results that were believed to address completely separate aspects of system's behaviour are now often considered as complementary results of the same evaluation that finds considerable benefits from their development within a unifying framework.

It is thus apparent that the common (mathematical and engineering) roots of many of these techniques and an increasing convergence of the interests of these research communities advocate a discussion forum where researchers active in these fields may join to exchange experiences and to plan new international projects for the advance of the area.

On the basis of these observations, the International Conference on Modelling Techniques and Tools for Computer Performance Evaluation (TOOLS), the International Workshop on Petri Nets and Performance Models (PNPM), and the Joint International Workshop on Process Algebras and Performance Modelling and Probabilistic Methods In Verification (PAPM-ProbMIV) decided to organize joint events on various occasions since the Summer of 1997, with various combinations of constituent workshops/conferences participating each time. Subsequently, at the meeting held at the University of Illinois in 2003 (which included PNPM and TOOLS), participants from PNPM and TOOLS decided to come together, together with PAPM-ProbMIV, to form a permanent union.

This union resulted in *QUEST: The International Conference on Quantitative Evaluation of Systems*. A URL was set up for the conference ([www.qest.org](http://www.qest.org)), currently hosted at the Univ. of Illinois.

The objective of QUEST is to be the leading forum for contributions on all kinds of evaluation and verification of computer and communication systems, through measurements and stochastic models, possibly incorporating non-deterministic behaviour.

Topics of interest cover the areas of modelling formalisms and methodologies, measurements, analytical and numerical evaluation, simulation and verification, theory of probabilistic systems, and case studies showing the practical applicability of these results. Moreover, tools for supporting the practical application of research results in all the above areas are explicitly considered with an emphasis on the maturity of their developments and on the (software) engineering of their organizations to support the penetration of these techniques in the common practice of the development of industrial products.

Properties of interest include, but are not limited to performance, dependability (e.g., reliability, availability), safety, security, and survivability. A detailed, although non exhaustive, list of topics addressed by this new conference is the following:

- Probabilistic decision making and planning,
- Verification of stochastic and probabilistic systems,
- Formal specification techniques,
- Stochastic and timed Petri nets,
- Stochastic process algebras,
- Probabilistic extensions of UML,
- Schedulability analysis,
- Stochastic and timed automata,
- Concurrency theory for probabilistic systems,
- Performance, dependability and robustness benchmarking, measurement and testing,
- Analysis of randomized algorithms,
- Numerical and analytical evaluation techniques,
- Discrete-event, continuous, and hybrid simulation techniques,
- Approximate performance evaluation techniques
- Performance, dependability, and security evaluation and control,
- Model-checking algorithms,
- Non-Markovian system models and algorithms,
- Queueing networks,
- Hybrid Systems
- Multi-formalism and hierarchical modelling and evaluation techniques,
- Real time and reactive systems,
- Application to AI and planning,
- Software tools in support of all these quantitative evaluation techniques, and
- Practical experience studies and case studies showing the role of quantitative evaluation in the design of systems and applications including computer architecture, distributed and fault-tolerant systems, wireline and wireless communication, embedded systems, web-based systems safety-critical systems, and workflow, manufacturing and transportation systems.

## 2. Historical Perspective

To preserve the historical record, and to give perspective to the heritage of QEST, this section lists past editions of the meetings that came together to form QEST.

The Tools conference started in 1984 and took place (usually) once per 18 months: Paris (1984), Sophia-Antipolis (1985), Paris (1987), Palma (1988 and 1998) by Puigjaner, Torino (1991) by Balbo, Edinburgh (1992) by Pooley & Hillston, Vienna (1994) by Haring, Heidelberg (1995) by Beilner, Saint Malo (1997) by Marie, Chicago (2000) by Haverkort & Smith, London (2002) by Harrison et al., and Urbana-Champaign (2003) by Kemper & Sanders. Since 1995, the proceedings have been published as LNCS volume. Since 1998, a special issue of Performance Evaluation was devoted to the conference.

ProbMIV has been organized since 1998, in Indianapolis (1998) by Baier, Huth, Ryan and Kwiatkowska, in Eindhoven (1999) by Kwiatkowska, and as a joint, single workshop with PAPM in Aachen (2001) by de Alfaro & Gilmore, and in Copenhagen (2002) by Hermanns & Segala. The proceedings of the joint meetings (2001 and 2002) were published as LNCS volumes. In 1998 an issue of Electronic Notes in Theoretical Computer Science was devoted to ProbMiv. In 2000 and 2003, a Dagstuhl seminar was organized with representatives of the PAPM, the PNPM and ProbMIV areas that involved various researchers from performance modeling and dependability analysis.

Organizers of these seminars were, respectively, Kwiatkowska, Herzog, Vardi and Meindl in 2000, and Kwiatkowska, Vardi and Haverkort in 2003.

PAPM has been organized since 1993 in: Edinburgh (1993) by Hillston, Regensberg (1994) by Herzog & Rettelbach, Edinburgh (1995) by Hillston, Torino (1996) by Ribaud, Twente (1997) by Brinksma & Nymeyer, Nice (1998) by Priami, Geneva (2000) by Gorrieri, and joint with ProbMIV in Aachen (2001) and Copenhagen (2002), see above. The proceedings were usually published as technical reports, the last two editions appeared as LNCS volume. In 1995, a special issue of *The Computer Journal* was devoted to the PAPM workshop.

The history of PNPMP dates back to 1985, and the workshop took place according to a bi-annual scheme: Torino (1985) by Balbo et al., Madison (1987) by Murata et al., Kyoto (1989) by Kumagai & Nishio, Adelaide (1991) by Henderson & Field, Toulouse (1993) by Juanole, Durham (1995) by Trivedi, St. Malo (1997) by Marie, Zaragoza (1999) by Silva, Aachen (2001) by German & Haverkort, and Urbana-Champaign (2003) by Ciardo & Sanders. Proceedings were published by IEEE CS Press, and often a special issue was devoted to PNPMP by *IEEE Transactions on Software Engineering* (e.g., the special issue for the 1991 conference appeared in *Performance Evaluation*; there is no special issue related to the 1999 conference).

## **2.1. Scope and Size**

The focus of QEST is on the development of theory, sound methodological approaches, and software tools for the evaluation of practical computer systems and networks. We strive for a submission of more than 100 papers or more, and an attendance of 150–200 researchers, both from academia as well as from industry.

## **3. Organization**

### **3.1. Format**

The conference will last three days, preceded by one day of tutorials. There will be at most two parallel tracks; up to three invited speakers will be plenary. There will be possibilities for tool demonstrations.

In addition to the General Chair (GC), there will be three Program co-Chairs (PCCs), a Tutorial Chair (TuC) and a Tool Demonstration Chair (TDC).

### **3.2. Frequency and Location**

The conference will take place annually in the second half of September. It is intended to organize the conference in North America on a regular basis, e.g., once every two or three years. In principle, the conference takes place in Europe in the other years, but other continents are welcomed.

The QEST conference takes place in 2004 at the University of Twente, Enschede, in the Netherlands. In 2005, it will take place in Torino, Italy, organized by the Università di Torino.

The selection of the location and the GC in year  $200n+3$  will take place during the conference in  $200n$  and will be decided by the steering committee based on the proposals offered to the committee.

In order to ensure that the research groups in the three areas underlying this conference are well represented, the steering committee will carefully consider the spreading of the organization and locations among those research groups, as well as selecting places that are “attractive,” and likely to yield a large attendance. Although it has been the practice of the constituent conferences to hold

events at the home location of the organizers, it may be desirable to hold meetings in attractive locations, even if no QEST researchers reside in the area.

### **3.3. Steering Committee**

To establish QEST, an Interim Steering Committee (SC) consisting of a more than 20 representative researchers from the different research areas was formed, led by Bill Sanders of the University of Illinois. The responsibility of this committee was to oversee the organization of first meeting, create this document, and oversee the establishment of the first regular SC.

The makeup of the Steering Committee will consist of the General Chairs of the previous five years, together with 6 elected members. The elected members remain on the SC for 3 years. One of the SC members acts as a chairperson (chosen by the SC). Members will be elected at the open Technical Committee meeting at the conference. Members will be elected in groups of two each year, to help maintain the continuity of the committee. It is the responsibility of the SC to put together a ballot of candidates for the elected members, consisting of all members of the community that are willing to run.

A first SC will be installed at the end of the QEST 2004 meeting. To establish the initial committee, the members representing the General Chairs will be taken to be the 5 General Chairs of the current QEST and the joint meetings that led to QEST: QEST 2004 in Sept 2004, The September 2003 Urbana Multiconference (which included PNPM and Tools), the May 2003 Probabilistic Methods in Verification and Planning (one of the Organizers, Marta Kwiatkowska) the 2001 Aachen Multiconference (which included PAMP/ProbMIV and PNPM), the 1999 Zaragoza Multiconference (which included PNPM and Tools), and the 1997 San Malo Multiconference (which included PNPM and Tools). Six members will be elected at the Technical Committee at the QEST 2004 conference, with two of those serving 3 year terms, and two of those serving 2 year terms, and two serving 1 year terms to start the election cycle.

The SC will meet at least once per a year, at the QEST Conference, but may also meet at the QEST PC meeting.

The SC will organize an open Technical Committee Meeting during each QEST conference, in which it reports on the recent developments, decisions, and so on, and during which new members for the SC are elected. The SC is responsible for, among others: selection of the location of conferences, selection of the general chair and the PC co-chairs, approval of the constituency of the PC, review of each year's Call for Papers, mid- and long- term perspective of the conference, and determining the scope (e.g., incorporating new evolving research areas). At the SC meetings, the next GC and PCCs will be invited as well.

### **3.4. Program Committee**

The PC will consist of 3 PC co-chairs, representing the diversity of our community. Of the PCCs, at most one is of the same institution as the GC. No two PC chairs will be from the same organization.

The PC co-chairs are responsible for the constituency of the PC in such a way that the broad technical topics of the conference are well represented, in consultation with the SC chair. They also may propose up to three keynote speakers for the conference in consultation with the SC and General Chair. Together, they organize the PC meeting in the year they serve, in consultation with the General Chair.

The selection of the PC chairs for year  $200n+2$  should be done by the time of the conference in  $200n$ . PC co-chairs are not allowed to act as a (co-)author of a paper submitted to the conference during the year that they serve. PC members are allowed to submit papers.

### **3.5. General Chair**

Responsibilities include overall responsibility for the success of the meeting, local arrangements, financial responsibility, sponsoring of the conference, hosting web pages for the conference, registration, and helping the co-PC chairs maintain a web server for the submission and review process. To encourage students to attend QEST, the general chair is encouraged to provide scholarships or reduced fee registration for students.

### **3.6. Important Dates**

|                         |                          |
|-------------------------|--------------------------|
| Date of the conference: | Second half of September |
| Submission deadline:    | March                    |

The CFP for the conference in year  $200n + 1$  should be available at the conference in  $200n$ .

## **4. Proceedings**

The proceedings of the conference will be published by IEEE Computer Society Press.

### **4.1. Paper Reviewing**

Each paper will be reviewed by at least three qualified reviewers.

### **4.2. Journal Special Issue**

The PC co-Chairs will be encouraged to arrange for the publication of extended versions of a small subset of high-quality papers in an established international journal. The choice of the journal will be made by the co-PC chairs, and approved by the SC.

Given the diversity of the topics covered by the conference, it might be considered to select papers for two journals, e.g., a more tool-oriented journal and a more performance-oriented journal, or a more theoretical journal, and a more application-oriented journal.

The PC co-chairs will select a number of high-quality accepted papers from the program and will act as the Guest Editors of the special issue, possibly together with an Associate Editor of the journal itself. The review and selection process should be planned in a tight manner allowing a journal special issue to appear not too long after the conference.

## **5. Establishment and Modifications**

This Organization Document is as approved by the Interim Steering Committee at its meeting on September 28, 2004 at the QEST 2004 meeting. Modifications to the document must be approved by a vote of more than two-thirds of the QEST Steering Committee.