

Unconventional Programming Paradigms 2004

the design of unconventional programming languages

15-17 September 2004 -- Mont Saint-Michel, France

<http://upp.lami.univ-evry.fr>

Motivations

The imperative, functional, object and logical paradigms still do not have met the high expectations of the 80's and the 90's in terms of reusability, modularity, correctness, expressivity, evolution, encapsulation, portability and, at last but not least, ease of programming. For example, there is still no clear agreement on a model for parallel programming or on a programming model best suited to develop provably correct code.

At the same time, developpers have to face the proliferation of the hardware and software environments, the increasing demands of the users, the multiplication of the programs, the integration of the functions within the same interfaces and the sharing of informations, competences and services thanks to the generalization of data bases and communication networks. This makes null and void the traditional design of the programs. A program is no more a monolithic entity conceived, produced and finalized before being used. A program is now seen as an opened and adaptive frame, which, for example, can incorporate dynamically services not foreseen by the initial designer. This new paradigm calls for new control structures and program interactions.

Unconventional approaches of programming have long been developed in various niches and constitute a reservoir of alternative avenues to face the programming languages crisis. These new models of programming are also currently experiencing a renewed period of growth to face specific needs and new application domains. Examples are given by artificial chemistry, declarative flow programming, L-systems, P-systems, amorphous computing, visual programming systems, etc.

These approaches provide new abstractions and new notations or develop new ways of interacting with programs. They are implemented by embedding new and sophisticated data structures in a classical programming model (API), by extending an existing language with new constructs (to handle concurrency, exceptions, open environment, ...), by conceiving new software life cycles and program execution (aspect weaving, run-time compilation) or by relying on an entire new paradigm to specify a computation. They are inspired by theoretical considerations (e.g. topological, algebraic or logical foundations), driven by the domain at hand (domain specific languages like postscript, latex, html, musical notation, animation, signal processing, etc.) or by metaphors taken from various area (quantum computing, computing with molecules, information processing in biological tissues, problem solving from nature, ethological and social modeling).

The practical applications of these new programming paradigms and languages prompt researches into the expressivity, semantics and implementation of programming languages and systems architectures, as well as into the algorithmic complexity and optimization of programs.

Aim of the workshop

We believe that there is a unique opportunity in the next few years to design and develop new concepts and approaches to face new needs in the computing field.

The purpose of this workshop is to bring together researchers from the various communities working on wild and crazy ideas in programming languages to present their results, to foster fertilization between theory and practice, as well as to favor the dissemination and growth of new programming paradigms. *Presentations of experimental systems that can be concretely used to investigate these new paradigms will be privileged.* Theoretical works on calculability and complexity is not under focus.

Topics include, but are not restricted to:

- **New metaphors for computation**
 - Biologically inspired programming languages (DNA computing, aqueous computing, L-systems, P systems, computing with bio-molecules...)
 - Physical computations (quantum computing, lattice gaz, simulated annealing, ...)
 - Social modeling for software architecture (agent)
- **Handling unusual entities**
 - computing with infinite objects (flows, trees, constructive sets, ...)
 - dealing with time (real-time programming, animation, multimedia programming, ...)
 - dealing with space (scene description, CAO, scientific visualization, ...)
- **New way of interacting with programs**
 - visual programming
 - diagrammatic and non-linear program representations
 - integration of several heterogeneous paradigms
 - non-standard life cycle (aspect, deployment, safe-healing systems, ...)
- **Driving applications**
 - simulation
 - nanotechnology
 - distributed, nomadic and open environments
 - virtual reality and animations
- **Theoretical foundations**
- **System descriptions and environments**

Organization of the workshop

We propose to organize an international workshop from 15 to 17 september 2004 in [Mont Saint-Michel](#).

This workshop will keep an informal style and of a previous very successful meeting held in 1991 in Le Mont Saint Michel under the title [New Directions in High-Level Parallel Programming Languages](#).

We propose to organise the workshop along six main tracks representing new and original orientations in Programming:

1. **Amorphous computing**
2. **Autonomic Computing**
3. **Generative Programming**
4. **Bio-inspired Computing**
5. **Chemical Computing**
6. **New ways of interacting with programs**

Each track will be handled by a well-known researcher in the concerned area. These track leaders plus the four promoters of this initiative will constitute the program committee of the workshop.

Each track leader will be in charge to invite 5 to 6 other researchers on his/ her topic. In order not to overload people with the writing of yet another paper, written contributions will take the form of a 6-7 pages extended abstract. Later, a volume containing a selection of (full) contributions will be published.

Program co-chair

- Jean-Pierre Banâtre, IRISA Renne, France
- Jean-Louis Giavitto, Evry Val d'Essone University, France
- Pascal Fradet, IRISA, France
- Olivier Michel, Evry Val d'Essone University, France

Program committee

- The co-chairs and the six tracks leaders

Contacts

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