Jean-Louis Giavitto

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Professional Preparation

- ENSEEIHT engineering schools, France[1]   Mathematics & Computer Science   1986
- University of Toulouse, France   Computer Science   M.Sc., 1986
- University of Orsay, France   Computer Science   Ph.D., 1991
- University of Orsay   Computer Science   Habilitation[2], 1999

Appointments

- 2006 – present. Co-founder and head of the IBISC laboratory (Informatics, Integrative Biology and Complex Systems), joint laboratory between the CNRS and the University of Evry

- 2006 – present. Senior researcher (research director) at CNRS[3] in computer science

- 2004 – 2005. Director of the LaMI laboratory (lab. of Computer Science Methods), joint laboratory between CNRS and the University of Evry

- 2003 – present. Redactor-in-chief of TSI (the only french scientific journal covering all fields in Computer Science and Computer Engineering)

- 2001 – 2004. Deputy director of the LaMI laboratory, University of Evry & CNRS

- 2000 – 2006. Research associate at the LaMI laboratory

- 1993 – 1999. Research associate at LRI, joint laboratory between CNRS and the University of Orsay

- 1992. Postdoctoral researcher, LRI, University of Orsay

- 1989 – 1991. PhD student, LRI, University of Orsay

- 1989 – 1990. Research project manager, Alcatel Research laboratory, Paris

- 1986 – 1988. Research engineer, Alcatel Research laboratory, Paris

Former Research Interests

- 1985 – 1988 : object and actor based languages and their implementation in a functional framework (Symbolics Lisp machine).

- 1998-1990 : incremental and generic environment for software development (inc. algebraic specification and CASE tool). The software objects are described using a formalism based upon typed and attributed graphs. The environment has been used in the METEOR, SPIN, IKAROS and IKARUS european projects as well as in Alcatel subsidiaries.

- 1990 - 1994 : data-parallel languages and parallel architectures. High-level (declarative) parallel computation models for the simulation of large dynamical systems. Implementation on the Connection machine and on network of workstations.

- 1995-1998 : Spatial and Intensional programming. Knowledge representation and diagrammatic reasoning based on algebraic topology. Analogy solving.

Synopsis of Current Research Interests. My current research interests are in unconventional programming paradigms (I have organized several workshops in this area, including a joint NSF-EC workshop). I design and develop the experimental MGS programming language (http ://mgs.spatialcomputing.org) where several concepts in spatial and chemical programming are designed and tested. An example is the development of a discret version of the well known differential operators. The MGS environment has been used to develop a large scale model of morphogenesis (e.g., the meristem growth at the cellular level) and has been used as the modeling language of the first french team at iGEM. My interest in synthetic biology are growing and I have just started a research project to develop the compilation of a high-level spatial programming language towards the biobricks.

Keywords : Unconventional programming language, Spatial computing, Amorphous computing, Synthetic Biology, the Chemical paradigm, Programming languages for autonomic systems, declarative language, modeling and simulation of complex systems, dynamical systems with a dynamical structure, computer modeling in system biology

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[1] For the French "Grande Ecole" see `en.wikipedia.org/wiki/Grande_ecole`. Specifically for ENSEEIHT, see `en.wikipedia.org/wiki/ENSEEIHT`.

[2] For the "habilitation", see `en.wikipedia.org/wiki/Habilitation`.

[3] The CNRS is the largest fundamental science agency in Europe, cf. `en.wikipedia.org/wiki/CNRS`.

Publications : **12** book chapters (9 in english), **6** edition of collective books (proceedings, etc.), **12** international journals (including *Fundamenta Informaticæ, Physica D, ACM Sigplan Notices, Natural Computing, Int. J. of Unconventional Comp., Acta Biotheoretica, Biosystems, Comparative and Functional Genomics, Journal of Biological Physics and Chemistry*, etc.), **3** national journals (with review), more than **35** international conferences with review and proceedings, more than **20** workshop or national conference with review and proceedings, about **70** séminar or invited lectures. Theses publications implied more than 50 co-authors. The bibliography is available at http://www.ibisc.univ-evry.fr/~giavitto/doku.php?id=publications

Synergistic Activities

- *Organizer (from 2004) : UPP*, Unconventional Programming Paradigms - Challenges, Visions and Research Issues for New Programming Paradigms (2004) : a European Commission and US National Science Foundation Strategic Research Workshop (coorganized with O. Michel, J.-P. Banâtre and P. Fradet). *Computing Media and Languages for Space-Oriented Computation*, Dagsthul seminar (2006) (coorganized with A. DeHon, CalTech and Univ. of Pennsylvania, and F. Gruau, Univ. Orsay). *Amorphous and Spatial Computing*, 2007 and 2008 (coorganized with H. Berry, O. Michel and F. Gruau).

- *Outreach and strategic committees (from 2006) : InterLink*, Future and Emerging Information and Communication Technologies : an european program for the definition of the next research agenda of the EU in software intensive systems and unconventionnal computing. Member of the evaluation committee of the *ANR DEFI program* (the ANR is a project-based funding Agency to advance french research and the purpose of the DEFI programme is an "emergent domains programme" that anticipates and prepares technology breakthroughs relative to the basic principles of digital processing and communication, including potential societal consequences). Member of the *Scientific board of ENSIIE* (french "Grande Ecole"). Member of the *executive board of GDR GPL*, the national working group on software engineering and programming language. Expert for the Rhones-Alpes county (scientific cluster Isle in informatics, signal processing and embeded software).

- *Editorial board :* editor-in-chief of "Technique et Science Informatique" (Computer Science and Computer Engineering) the only French scientific journal covering all area in computer science.

- *Program committee (from 2002) :* Macro Molecular Network 02, Visual Representations and Interpretations (VRI 02), Unconventional Programming Paradigms (UPP04), Rule03 and 05, Information proceesing in Cells and Tissues (IPCAT03 and 05), annual spring school "Modelling Complex BiologicalSystems in the Context of Genomics", starting from 2002 , Theory and Applications of P Systems (TAPS05), Nature Inspired Cooperative Strategies for Optimization (NICSO06, 07 and 08), Computing Media and Languages for Space-Oriented Computation (Dagstuhl06), Artificial Evolution (EA06 and 07), Amorphous and Spatial Computing (07 et 08), Symposium "Genes : an evolving concept" (2008).

- *Professional societies :* member of EATCS (European Association for Theoretical Computer Science), EAPLS (European Association for Programming Languages and Systems) and member of the executive board of ASTI (french professional Society of Sciences and Technologies of Information and Communication).

- *Instructor :* for the iGEM Paris team in 2007 (first price in the fundamental research category) and in 2008.

- *Dissemination of the scientific culture :* various action including the authoring of some sections of the Interstice web site interstices.info, extensive chapter in a book on mathematical modeling of morphogenesis and several talks for non computer scientist (e.g. philosophers and geographers).

- *PhD students graduated :* Abderrhamane Mahiout (mapping and scheduling data parallel tasks, 1992), Dominique De Vito (compilation of a declarative data-parallel dataflow language, 1994), Olivier Michel (dynamical space representation in a DSL, 1996 ; now full professor at the University of Paris-Est), Erika Valencia (algebraic topology for knowledge representation and diagrammatic reasonning, 2000 ; now European Patent Examiner at EPO), Julien Cohen, (integrating topological collection and transformation in a functionnal programming language, 2004 ; now assistant professor at the University of Nantes), Antoine Spicher (declarative handling of topological collection and its application to the modeling of dynamical systems with a dynamical structure, 2006 ; now assistant professor at the University of Paris-Est)

Co-authors and co-PIs during the last 48 months : J.-P. Banâtre (IRISA, Université de Rennes et INRIA) : new computing paradigms ; H. Berry (Alchemy Team, INRIA Futur Saclay) : amorphous computing and synthetic biology ; D. Coore (University of West Indies, Jamaica) : amorphous and spatial computing, synthetic biology ; P. Dittrich (University of Jena, Germany) : chemical and organic computing ; P ; Fradet (INRIA Grenoble) : chemical computing, aspect and DSL ; C. Godin (CIRAD/INRIA Montpellier and INRA) : models of morphogenesis ; F. Gruau (LRI, University of Orsay) : non conventional computer architecture and spatial programming ; A. Lesne (IHES and University of Paris 7) : multi-scale modeling of diffusion processes ; G. Malcolm (University of Liverpool) : rewriting systems and system biology ; M. Gheorghe (University of Sheffield) : P systems and molecular machines ; D. Pumain (University of Paris 1) : growth of cities ; P. Prusinkiewicz (University of Calgary, Canada) : spatial representation, declarative simulation and DSL.