# Four figures of Parisian AI research and four questions to ask them

**François Pachet**[a,*,1] **and Jean-François Perrot**[b,1]

[a]No affiliation
[b]LIP6, Sorbonne-Université

**Abstract.** In this paper, we attempt to restore part of the particular atmosphere that reigned in Parisian AI laboratories during the 1970s-1990s, *i.e*. from the arrival of personal computers until the birth of the internet. During this period, AI experienced a second winter, but paradoxically the ideas that were developed, notably thanks to the researchers we are talking about here, were extremely rich and influenced many AI researchers still active today. These four researchers, Patrick Greussay, Jean-Louis Laurière, Jacques Pitrat and Jean-Claude Simon, developed bold and complementary ideas. Thus, Greussay worked on programming languages, the essential tool (it was thought) for building AI systems. Simon was interested in the production of symbols from signals, particularly through handwriting recognition. Laurière made essential contributions to so-called symbolic AI, which can be seen as the production of symbols from other symbols. Pitrat developed original ideas on the architecture of AI systems, and the need, according to him, to build reflective systems, able to manipulate representations of themselves and their own knowledge. We ask each of them a question linked to his work which seems relevant to us.

## 1 Introduction

The dazzling successes of artificial intelligence, particularly Deep Learning, have eclipsed a whole bunch of previous work and original research that it seems appropriate today not to forget. Paradoxically, the main exponents of Deep Learning themselves regularly implore young researchers to come up with other ideas than those followed by the most popular models of the day (the large language models, at the time of writing this article). Here we propose to briefly retrace the visions of four particularly important researchers on the Parisian AI scene, whose work is today somewhat forgotten and deserves to be re-examined. The geographical proximity of these people made it possible to create numerous bridges between their ideas (and their teams), notably at the LAFORIA laboratory [6]. In a way, they have contributed to defining a "French Touch" of AI in a bygone but fertile era for the evolution of ideas on the nature and modeling of human intelligence. Lastly, In those times, AI was a branch of so-called Cognitive Sciences, as much as a branch of Computer Science. Following a constructivist approach, heavily influenced by Papert and Minsky, building systems was a means of investigating possibly ill-posed problems. Consequently, researchers often chose their object of study mostly because it was considered interesting *per se* . This is to be compared with the current situation, where general-purpose systems are "tuned" for direct use in industry.

* Corresponding Author. Email: pachet@gmail.com.
[1] Equal contribution.

## 2 Patrick Greussay

Patrick Greussay (1944-), musician and programmer, worked from 1969 in the computer science department of the Centre universitaire expérimental de Vincennes, later University of Paris-VIII-Vincennes. He co-founded the Art and Computers Group of Vincennes (GAIV [17]), bringing together visual artists, architects, musicians, and engineers, which brought artificial intelligence into European artistic practices [16]. Greussay wanted to equip himself with tools that did not exist in France at his time. He carried out an implementation of Lisp on small machines (*VLisp*, "the Lisp of Vincennes, the fastest interpreter in the world", it was said) which played a considerable role in France; he explored the so-called "AI languages" (Plasma, Planner, Conniver) up to Smalltalk and object-oriented programming. Programs were supposed to imitate human thought processes, and languages had to make it easy. The great virtue of Lisp, according to him, was to "keep imagination intact". He played a key role in the thesis supervision of many French computer scientists, notably Pierre Cointe, who initiated work on the reflexivity of object-based languages [12]. The programmers and musicians of the GAIV played a major role in the creation of IRCAM (Acoustic/music research and coordination institute). However, it is today no longer obvious that engineers need programming languages at all. Programming itself seems threatened as an activity, with advances in automatic programming or no-code [1].

**Question: Do we still need specific programming languages for AI at a time when AI seems to make languages useless?**

## 3 Jean-Louis Laurière

Jean-Louis Laurière (1945-2005) [7] was a professor at the Pierre and Marie Curie University and he strongly influenced French research in so-called symbolic AI. His work, notably the *Alice* system (to solve combinatorial problems) and then the *Snark* system (to write inference rules for expert systems, which were in great fashion at that time), were pioneers in their fields. *Alice* [13] contains revolutionary ideas for the time, some of which are still relevant. One of *Alice*'s boldest ideas was to combine two representations of the same combinatorial problem, both in symbolic form (the constraints as they are expressed, in the form of equations or inequalities) and in the form of a graph, allowing in particular to perform intelligent filtering,

in order to reduce the search space. Although constraint programming is often credited to Alain Colmerauer (yet another important French figure of AI) and the logic programming school, we consider the work of Laurière, with Mackworth [18], the primary ancestor of constraint programming, at least for the filtering dimension. Indeed today, most constraint satisfaction solvers and libraries have gotten rid of the logic programming layer. His charismatic personality and outspokenness appealed to a whole generation of students and convinced them to work on knowledge representation.

**Question: Is the inference problem solved? Why do we no longer talk about complexity (P versus NP)?**

## 4 Jacques Pitrat

Jacques Pitrat (1934-2019) [9] is considered one of the founding fathers of French AI. His long career has accompanied the evolution of AI since the beginning (programmatic AI, where we thought we could solve problems using algorithms) with notable work on chess games [19] as well as the unification algorithms so useful to Prolog. However, his major contribution was to take an early interest in the reflective capacities of artificial intelligence systems, and to highlight the need to build a system truly capable of learning by itself, of knowing itself, in order to produce and manipulate meta-knowledge. Superviser of Laurière's Ph.D., he was deeply impressed by his vision - he has for example produced numerous reflexive reformulations of the *Alice* system. His latest work focused on the creation of an artificial researcher in artificial intelligence [20]. This theme which, at the time, could seem iconoclastic and unrealistic is today taken quite seriously [14, 11].

**Question: is meta-knowledge soluble in the architecture (for example so-called auto-regressive networks?) How can a modern AI system be provided with the capacity for introspection other than by reifying its own meta-knowledge?**

## 5 Jean-Claude Simon

Jean-Claude Simon (1923-2000) [10] was mainly interested in shape recognition, and in particular handwriting recognition. He cofounded one of the first companies dedicated to this issue, A2IA [5], which still exists today. He was also one of the main players in the university master IARFAG that trained most of the French AI researchers of that time. In an interview broadcast on radio *France Culture* in 1971, he described, using non-technical vocabulary, the architecture of a shape recognition system capable of identifying handwritten characters. It is striking, in this interview, that the main ideas of today's convolutional systems (developed in particular by Yann Lecun, a former student of J.-C. Simon [15]) seem already there. In particular the Gestalt-inspired idea of reducing an image to its primitive components, then recomposing them in a hierarchy of parts to eventually come up with an informed decision (which letter is written). A vision that took 40 years to materialize! Today, when the analysis of images and signals of all kinds reaches performances that were once unimaginable, surpassing those of humans, we'd like to ask him:

**Question: have we gotten everything we can from signal analysis? Is pattern recognition still a relevant area of research?**

## 6 Conclusion

This article aims to shed light on four French researchers who had considerable influence on the AI of their time. In a way, they were already aiming at achieving a kind of artificial general intelligence. They followed a reductionist method: each one focusing on his own domain.

The spectacular advances in deep learning technologies have had the side effect of obscuring a whole series of concerns (notably the end of specialized domains of AI), some of which are still relevant today. Of course, we would love these researchers to answer our questions (and many others!) regarding the impact and continuation of their work. Perhaps thanks to AI, it will be possible one day to know their answers.


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The National Audiovisual Institute (INA), the largest audiovisual archive center in the world, organizes monthly seminars [8] during which a scientist talks about his field through the filter of INA archives. On this occasion, the first author proposed in 2023 a history of AI through a selection of archives [2, 3], during which he discovered fascinating documents on the pioneers of the AI French scene [4].


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