

# Logic Programming in Italy: A Historical Perspective

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**Abstract.** The history of Logic Programming in Italy is largely that of GULP, the Italian Association of Users and Researchers in Logic Programming. This paper provides a historical perspective on the birth and development of GULP in the last 25 years. The paper is mainly concerned with what has been done in Italy, but it also points out the many relationships and synergies that emerged—and still exist—in the field of Logic Programming, between Italy and other countries all over the world. I identify three main periods in the history of GULP, which closely correspond to different seasons in the history of Logic Programming in general, and I try to characterize them in terms of activities the GULP supported and of the achievements obtained by its members.

## 1 Introduction

The history of Logic Programming (LP) in Italy is largely that of GULP, the Italian Group of Users and researchers in LP.

GULP was founded 25 years ago (1985) as a non-profit organization. It was the first national LP association to be established in the world. Since its very beginning, GULP has been constantly committed to keep the interest in LP and related themes alive by promoting various initiatives both in research and in education. Its main role—in my opinion—has been to provide an opportunity for young researchers to be introduced into an active and challenging research area in a very informal and friendly way.

LP in Italy, and its representative association GULP, have gone through several phases in the last 25 years. For the sake of the presentation, I will group these phases in three main periods:

- The Early Years, approximately 1984—1993
- The APPIA-GULP-PRODE Years, approximately 1994—2003
- The CILC Years, approximately 2004—2010.

It turns out that these periods closely correspond to different seasons in the history of LP in general.

This paper shows how the original activities of GULP has evolved in the last 25 years, mainly with reference to what has been done in Italy but with a wider, world-wide perspective in mind. To this end, I will try to point out relationships

and synergies that have been established between Italian researchers in LP and the rest of the world. Needless to say, I will try to highlight not only positive but also negative aspects in the history of LP in general and particularly in Italy.

I will conclude by stressing that LP in Italy is still alive and there are many people who still believe in it, although it seems necessary to radically change the way of presenting LP and the LP community to the outside world.

## 2 The Early Years (ca. 1984—1993)

The idea of creating an association of Prolog users took place during a workshop organized by Luigi Marcolungo and other colleagues from the University of Padua in November 1984. The constituent assembly of GULP was held in Pisa on June 18th, 1985 (see Appendix A.4 for the first executive committee). This is the official starting date, that is widely accepted as the starting point for the history of LP in Italy.

Actually, various Italian researchers were interested in LP well before this date. In particular, as long ago as 1974, Enrico Pagello and some young colleagues from Milan and Padua installed a Prolog interpreter on their computers at Politecnico of Milan and at the University of Padua, using it for their applications in robotics (see also the paper by Dal Palù and Torroni in this volume). On the more theoretical side, various researchers from Pisa were already investigating Prolog programming in the seventies (e.g., [1]).

In the first year, GULP had more than 160 members. The interest in LP, from both the academic and the industrial sides, was constantly growing in Italy and around the world. Since 1986, GULP started to organize an annual national conference on LP (see Appendix A.1). These conferences represented—and still represent—the main occasion for all people (researchers, users, and developers) dealing with LP in Italy to meet and to exchange ideas and experiences.

Main topics of interests in LP in Italy in those years were:

- Transformation of logic programs (including partial evaluation)
- Metalogic programming
- Semantics of logic programs
- Non-monotonic reasoning
- Constraint Logic Programming
- Concurrent Logic Programming
- Program modularity and object-oriented in Prolog.

Italian contributions on all such topics were at the highest international level, as testified by the many contributions presented at LP international conferences and workshops between the 80s and the early 90s. Many connections with researchers all over the world were established in that period. To cite only a few of them, in strict alphabetic order: Maria Alpuente, Krzysztof Apt, Michael Codish, Philippe Codognet, Frank de Boer, Georg Gottlob, Manuel Hermenegildo, Pat Hill, Antonis Kakas, Bob Kowalski, Michael Maher, Germán Vidal, Carlo Zaniolo. All of them, and, of course, many others that I did not mention, had (and, in many cases, still have) strict collaborations with Italian researchers in LP.

A detailed report of the huge amount of work put forward in those years can be found in the book on ten years of Logic Programming in Italy, edited by Maria Sessa [8]. Developments on these and other topics are also discussed in more details in other companion papers in this volume.

Many universities and many centers of the National Research Council (CNR) were involved in these first years of LP in Italy. Among them, the University of Bologna, Calabria, Genoa, Padua, Pisa, Rome, Turin, and Udine and CNR centers of Genoa, Pisa, and Rome were the most active. The Pisa group, however, spurred by the restless efforts of Giorgio Levi, surely was the leading group in LP in Italy in those years.

Significant interests in LP came also from industries. Major Italian companies such as CSELT, DATAMONT, Digital, ELSAG, Enidata, and Olivetti were involved at some extent in research and development of LP. Also smaller companies, such as DS-Logics, ICON, and Systems and Management, widely used LP to develop concrete applications, in different fields. But also many other companies were interested in LP, even if not as a main tool. Looking at the list of participants at the constituent assembly of GULP in 1985, we can easily realize that almost half of the participants came from industries (see Appendix A.4). The interest of Italian companies in LP is also well testified by the many contributions presented at the first GULP conferences.

In the meantime, the LP paradigm was spreading around the world. These were the fabled heydays of LP with over 300 attendants at ICLP conferences. This was also the era of the Fifth Generation Computer Systems (FGCS) project, which launched the idea of (concurrent) logic programming as the key programming language of next generation computer systems. The project was launched in April 1982 with the opening of ICOT. The second FGCS conference held in Japan in 1984 was a very big event. The multi-billion yen budget of the FGCS project was carrying the LP field out of its narrow boundaries of the early days (see [4]).

Competing projects were set up in the U.S.A. and in Europe, such as the European Strategic Program of Research in Information Technology (ESPRIT). In 1984 ECRC (European Computer Industry Research Centre) was also founded in Munich, on the initiative of three major European manufacturers: Bull (France), ICL (UK), and Siemens (Germany). (Constraint) Logic Programming was one of the main research topics of ECRC since its foundations [5].

In Italy, a number of national projects, mostly founded by the Ministry of Education and by CNR, were devoted to LP and LP-related topics. Among them:

- “Languages and architectures for functional and logic programming”, 1984–1987
- “Software Architectures for Intelligent Systems”, 1985–1987
- “Automatic reasoning techniques in Intelligent Systems”, 1987–1989
- “Intelligent Systems”, 1990–1992
- “New Programming Languages”, sub-project of the CNR project “Sistemi Informatici e Calcolo Parallelo”, 1989–1994.

In particular, the last project involved, besides many universities, also a number of CNR research centers and Italian industries, such as DS-Logics, ICON, Italdata, and led to the development of some interesting applications using the LP paradigm. The main results of the project are summarized in [3].

Italian researchers were involved also in international projects focusing on LP. In particular, the ESPRIT project ALPES (P973) “Advanced Logic Programming Environments” started in June 1986 (actually preceded by a preliminary phase started in 1984). The objective of the project was to build the prototype of a high-level programming environment for logic programming and the Prolog language in particular. The consortium was formed of six partners, among which the Italian Software company Enidata, and five sub-contractors, including the Universities of Rome and Bologna, and an Institute of CNR in Rome.

An important event for the LP community in Europe, and in particular in Italy, was the launch, at the end of the 80s, of the ESPRIT Basic Research Action Compulog (3012) “Computational Logic”, followed in years 1992–1995 by the Project Compulog 2 (6810). Furthermore, as a complement to the activity of the Compulog Project, in 1990 Bob Kowalski launched the idea of a Network of Excellence in the field of computational logic. Compulog Net officially started on April 15th, 1991. Luigia Carlucci Aiello, from the University of Rome, was appointed network coordinator and Consorzio Roma Ricerche began to take care of the coordination and administration of Compulog Net. The scientific objective of Compulog Net was to lay the foundations for an integrated software development environment for building knowledge-rich applications by extending the logic programming paradigm.

Each node in the network represented an institute, research laboratory or company active in the area of computational logic. The number of nodes in the network was initially 17 but after a few years the network consisted of more than 80 nodes.

The network had its First General Meeting in Rome in May 1991, jointly with a workshop of the Compulog I Project. In August 1994, the Italian nodes of the network were:

- IRST (“Istituto per la Ricerca Scientifica e Tecnologia”), Trento
- Università di Bologna
- Università di Genova
- Università di Milano
- Università di Padova
- Università di Pisa
- Università di Roma La Sapienza
- Università di Roma Tor Vergata
- Università di Torino.

In particular, the University of Pisa was the coordinating node of one of the five main research areas initially chosen for the network, namely Programming Languages. The first and second Compulog Net area meeting on Programming Languages were held in Pisa in April 1992 and May 1993, respectively.

A personal memory to conclude this section. At the beginning of the 90s, I met Eugenio Omodeo in Udine. From the synergy of his expertise in computable set theory and my skills in LP, and with the invaluable insight of two young (at that time :-)) students of the University of Udine—namely, Agostino Dovier and Enrico Pontelli—we concretized our idea of Logic Programming with Sets, which has been the leitmotiv of my research activity in the last fifteen years and one of the many research topics connected with LP.

### 3 The APPIA-GULP-PRODE Years (ca. 1994—2003)

The beginning of the 90s represents the period of maximum glory of LP in the world.

Besides the already well-established International Conference on LP (ICLP) and International Symposium on LP (ILPS), along with their joint editions (JICSLP), a number of new international conferences and workshops started in that period. Among them:

- PLILP - Int. Symposium on Programming Language Implementation and LP
- WELP - Int. Workshop on Extensions of Logic Programming
- PAP - Int. Conf. on the Practical Application of Prolog
- LOPSTR - Int. Workshop on Logic-based Program Synthesis and Transformation
- META - Workshop on Meta-Programming in Logic
- LP & NMR - Int. Workshop on LP and Non-Monotonic Reasoning
- LPAR - Int. Conf. on LP and Automated Reasoning
- CCL - Int. Conf. on Constraints in Computational Logic
- ILP - Int. Workshop on Inductive LP.

Moreover, various international schools were specifically devoted to LP, or they mentioned LP as a central topic of interest. In September 1992, Compulog Net supported a summer school on LP in Zurich (Switzerland), organized by Gerard Comyn (ECRC) and Norbert E. Fuchs (University of Zurich). The ESSLLI Summer School in Logic Language and Information was organized each year since 1989. Also, more general schools, such as the Int. School for Computer Science Researchers, organized each year by Alfredo Ferro (Università di Catania) and other colleagues on the island of Lipari (Italy) under the auspices of the European Association for Computer Science Logic (EACSL), saw a growing number of lectures devoted to LP.

Attention to applications and to the industrial transfer was very high in those years. In 1993 “Prolog 1000”, a catalogue of Prolog applications edited by Chris D. S. Moss at Imperial College, contained about 500 entries. A first summary of the catalogue appeared in ALP Newsletter Vol. 6/2, February 1993, pages 3—7. Conferences such as “Prolog for Industry” and “INAP - Symp. and Exhibition on Industrial Applications of Prolog”, served to provide industrial attendees with examples of applications of LP in several industrial areas.

1994 is also the year of ICLP for the first time in Italy. The main LP Conference was organized by Maurizio Martelli in the magnificent surroundings of Genoa (Santa Margherita Ligure) in June 1994. In those years other important LP related events took place in Italy. Among them:

- WELP'92 - 3rd Int. Workshop on Extensions of Logic Programming, Bologna, 1992, organized by Evelina Lamma and Paola Mello
- ALP'92 - 3rd Int. Conf. on Algebraic and LP, Pisa, 1992, organized by Giorgio Levi and Helene Kirchner
- WSA'93 - 3rd Int. Workshop on Static Analysis, Padova, 1993, organized by Gilberto Filè.

The number of members (full, students, honorary) of the Association for Logic Programming (ALP) in June 1994 was quite high: 488. Many of them were also organized in local associations affiliated to ALP. In 1994 the affiliated societies were:

- AFCET (France) with 105 members
- ALP-UK (United Kingdom) with 131 members
- GLP (Austria, Germany, Switzerland) with 93 members
- GULP (Italy) with 113 members.

Furthermore, other related associations and special interest groups in Europe were more and more involved in LP. Many of their members had strong collaborations with members of GULP. Thus in 1993 the GULP executive committee decided to organize the next annual conference jointly with the Spanish conference on Declarative Programming PRODE (“Programación Declarativa”). The first joint conference on Declarative Programming GULP-PRODE'94 was held in Peñíscola (Spain) in 1994. Two years later, the conference was enlarged to another very active community in Europe, that of the Portuguese Association for Artificial Intelligence APPIA (“Associação Portuguesa para a Inteligência Artificial”) founded in 1984 in Portugal. From 1996 to 2003, for eight years, the three communities met together at least once a year, alternatively in Italy, Portugal and Spain. A complete list of the GULP-PRODE and APPIA-GULP-PRODE Conferences is reported in Appendix A.1.

In the meantime, Compulog Net was fully operational. The interest in the network activity soon attracted new leading centers in addition to the initial ones: the number of nodes in the network quickly grew to over 80 units, involving several hundred members from more than 20 countries. In addition to Luigia Carlucci Aiello, the executive council of Compulog Net now included other two Italian representatives, Giorgio Levi and Paola Mello from the Universities of Pisa and Bologna, respectively.

On the other side of the Atlantic Ocean, at the end of 1996 the idea of Compulog Americas took shape, an organization of logic programming researchers in North America (but hoping to involve researchers from both North and South Americas as well). It was explicitly modelled after Compulog Europe from which it drew much of its inspiration. The activities of Compulog Americas were organized within several sub-areas, each with an area-coordinator. The initial chief coordinators of Compulog Americas were Gopal Gupta and I.V. Ramakrishnan.

Despite the growing number of initiatives concerning LP and the availability of more and more efficient implementations of Prolog, however, the interest for LP by the industrial world was progressively but inexorably decreasing. Prolog-based applications hardly were able to become real products.

This negative trend is particularly evident in Italy. Looking at the list of participants to the ICLP Conference in Genoa in 1994 it is evident that the industrial participation is almost absent. The same is true for GULP conferences: since the second half of the 90s, participants came only from universities and public research centers. More generally, participation of people from industries to the activities of GULP completely disappeared in those years. One at a time, industries were abandoning investments in LP.

The reasons for such a disappointing result were partly connected to the specific Italian weakness in advanced industrial research in those years (and, unfortunately, also nowadays), but they were surely connected with also more general world wide issues.

One reason for this is the general disappointment resulting from the perceived failure of the Japanese FGCS Project. It is widely accepted that the FGCS Project did not meet the expected success, though the discussion on this topic lasted long (see [4] for an account on results and possible developments of the Project). Since in the mind of many people LP was synonymous with the FGCS Project, LP was (and, unfortunately, often still is) perceived by many people as an experiment that was tried in the 80s and that did not work.

As a direct consequence, during the 90s, most industries stopped funding LP based research projects, and the research momentum developed by the FGCS Project disappeared.

Another phenomenon that occurred in that period is the birth, or simply the strengthening, of new associations and groups in neighboring areas, such as constraint programming, inductive logic programming, deductive databases, static analysis, knowledge representation. This caused a progressive migration of many researchers born and raised in the area of LP to these related areas, in which they still continued to use their background in LP but without considering themselves part of the LP community.

In Italy this is particularly true for the neighboring associations of Artificial Intelligence AI\*IA (“Associazione Italiana per l’Intelligenza Artificiale”) and the European Association for Theoretical Computer Science (EATCS). Many former GULP members moved to these associations and definitively abandoned GULP.

As a tangible result of this declining interest in LP, in particular in Italy, from the 60 papers presented at the GULP-PRODE Conference in Peñíscola in 1994 (with almost half by Italian authors) we arrived to only 20 papers presented at the APPIA-GULP-PRODE Conference in Madrid in 2002 (with only 7 Italian authors).

There are several articles and discussions about lights and shadows of LP in the literature and on the Web (see, e.g., [7] for Kowalski’s personal opinion on why “LP has not made the impact in Computing that many of us once expected”). An analysis of the possible reasons for the lack of success of the LP

paradigm and the subsequent loss of interest in it, especially from industries, is out of the scope of this paper. What I want to stress here is that this negative trend that characterized the history of LP in the world since the beginning of the 90s, characterized the history of LP in Italy and of its representative association GULP, as well.

Despite the widespread feeling of something not working in the right way, several efforts have been put forward in the second half of the 90s, both in the field of LP training and in research projects connected with LP.

From 1996 to 2002 GULP organized four very successful summer schools on LP in Sardinia and Calabria (see Appendix A.2). Italian researchers in LP still continued to propose national projects dealing, more or less explicitly, with LP. Among them:

- CNR special project “Logic Programming Languages” (coordinator M. Martelli), 1996–1997
- CNR coordinated project on “Logic Programming: program analysis and transformation tools, software engineering techniques, extensions with constraints, concurrency and objects” (coordinator M. Martelli), 1997–1998
- GNIM (“Gruppo Nazionale per l’Informatica Matematica”) project “New computation paradigms: languages and models” (coordinator E. Omodeo), 1999–2000.

To the end of the 90s, however, the age of projects focusing on LP came at the end. The involvement of LP was rather on the inside of more general projects, where LP could play an important but, anyway, accessory role. One of them, to which I personally participated, is the M.U.R.S.T. Co-financed project “Automatic Program Certification by Abstract Interpretation”, coordinated by Roberto Giacobazzi (1999–2001).

All these projects, however, involved only people from universities and CNR centers. At the end of the 90s, Italian industries had completely stopped to invest in LP research and development projects.

On the international side, an important achievement for the LP community was the opening of the new ACM journal “Transactions on Computational Logic (TOCL)”, founded by K. Apt in 2000. Actually, as explicitly stated in the journal aims, TOCL is devoted to the research concerned with all the uses of logic in computer science; LP is one of the areas. This widening of horizons, from LP to the more general area of Computational Logic (CL), is a trend that characterizes the history of LP in Italy, as well as in the rest of the world, from the half of the 90s to nowadays.

A further example of this enlarged view of LP is the foundation of the Network of Excellence in Computational Logic CologNet. The network started in January 2002 and officially terminated in June 2005. It was an European-funded Network of Excellence which was intended to continue the role played by the Compulog Net network (ended in 2001). It published also an on-line newsletter which is still available at <http://newsletter.colognet.org/>.

Various Italian research centers participated in the network. In particular Francesca Rossi at the University of Padua coordinated the Constraint Logic



Programming site, while Enrico Franconi at the University of Bozen coordinated CologNet nodes working in Logic and Natural Logic Processing.

With the scientific sponsorship of CologNet and of many other European associations, since 2004 the University of Bozen offered (and still is offering) the European Masters Program in Computational Logic (EMCL). EMCL is an international distributed Master of Science course, in cooperation with Technische Universität Dresden, (Germany), Universidade Nova de Lisboa (Portugal), Technische Universität Wien (Austria), and Universidad Politécnica de Madrid (Spain).

## 4 The CILC Years (ca. 2004—2010)

As mentioned above, at the end of the 90s many LP researchers realized that it was absolutely necessary to widen their horizons, thinking LP not only *per se* but mainly as a key tool to understand problems and to support solutions in relation to other disciplines. Reporting on his period as the president of the ALP, Krzysztof Apt wrote in the ALP Newsletter issue of February 2001 “My main objective was to make logic programming more known outside of our own circle and to ‘connect’ it better with other areas of computer science. Fortunately, as it turned out, several of my colleagues independently shared this objective, as well ...”.

In an attempt to meet this requirement, the GULP executive committee, in a meeting held in Venice in December 2003, decided to reorganize its annual conference. The conference changed its name to “Convegno Italiano di Logica Computazionale” (CILC), i.e., Italian Congress of Computational Logic, to open it to a larger audience. Moreover, in order to attract young people, the costs of participation were drastically cut down. Thus, the GULP annual conference moved towards a lighter organization and (unfortunately) we had to return to a national dimension, interrupting our collaboration with APPIA and PRODE. The list of CILC conferences held from 2004 to nowadays is shown in Appendix A.1.

In the meantime, new topics of interest for the LP community emerged, most of which were on the boundary with related disciplines, such as Artificial Intelligence and Deductive Databases. Among them I can mention:

- Multi-Agents systems
- Semantic Web
- Answer Set Programming
- Knowledge discovery and learning
- Static analysis
- Model checking
- Knowledge representation and automated reasoning
- Computational biology.

All of them were included in the topics of interest of CILC. This was in accordance with the new philosophy of GULP to enlarge its scope as much as possible.

Most of these topics represented, and still represent, important research areas within the Italian LP community. Consequently, several chapters of this book are devoted precisely to them.

Since the beginning of the CILC age, the LP community in Italy has been quite stable. During these years, the GULP association maintained a steady size of about 60 members, most of which were PhD students and young researchers. Members were spread over the whole country and abroad (about 30 universities and research centers are involved at present). The number of people attending the annual conference has been constantly more than 50, while the number of submitted papers has varied from 25 to 30. Unfortunately, also the presence of industries to all activities supported by GULP in the last years has been constantly very low (actually, almost nothing).

More or less the same situation occurred within the international LP community. A precise account of the past activities and what is going on in the LP community can be found in the ALP Newsletter, the official newsletter of ALP since 1987. The Newsletter is available on-line since May 2001. Sandro Etalle and, later, Enrico Pontelli have been the editors of the new electronic version of the Newsletter (by the way, Sandro and Enrico are two of the many Italian researchers in LP that approached LP within the GULP community and that now are living and working abroad). From May 2006, the Newsletter contains, among others, a very interesting column dedicated to presenting personal historical perspectives on the field of LP.

The main LP conference, ICLP, has been regularly held each year, many times co-located with other related conferences. In December 2008, in particular, it was held in Udine (Italy), organized by Agostino Dovier. In addition to ICLP, other conferences continued to be tightly connected with LP, such as the conferences on “Principles and Practice of Declarative Programming” (PPDP), “Practical Aspects of Declarative Languages” (PADL), and “Logic Programming and Non-Monotonic Reasoning” (LPNMR). Many LP contributions, however, have moved in those years to related conferences in classical neighboring areas such as Artificial Intelligence, Deductive Databases and Theoretical Computer Science, as well as in emerging new areas such as Semantic Web and Multi-Agent Systems.

Like in Italy, moreover, it is undeniable that attention to LP from industries was inexorably decreasing everywhere. These are also the years to reflect upon the problems (technical, social, ...?) that was afflicting the LP community. The article by Tom Schrijvers “A Wake-Up Call for the Logic Programming Community”, in the ALP Newsletter vol. 20 n. 3/4, is symptomatic to this respect. There was (and still there is) even the need to clarify the very notion of LP, as pointed out in the worried letter by Bob Kowalski entitled “Logic Programming in Wikipedia - A Call for Help”, in the ALP Newsletter vol. 20 n. 1. The question is far from being closed as the recent article by Carl Hewitt [6] and the lively discussion that followed its publication (see, e.g., <http://lambda-the-ultimate.org/node/2803>) clearly demonstrate.

In the last years, a big effort has been devoted by the LP community all over the world to teaching LP and, more generally, to form young researchers with

a correct LP background. Among the many initiatives that moved along these lines we can mention the international summer schools in “Constraint and LP” and in “LP and Computation Logic” that were held in Dallas, Texas (2004) and in Las Cruces, New Mexico (2008), following the highly successful 1st summer school in (C)LP held in Las Cruces, in 1999. The schools were especially directed to Ph.D. students who were just about to start research, post-doctoral students interested in entering a new area of research, and young researchers.

On the Italian side, an important initiative of GULP were the two editions of the Best Italian PhD Dissertation Award in Computational Logic that have been assigned in 2006 and in 2009 (see <http://www-lia.deis.unibo.it/gulp/Burocrazia/PhD-awards.html>). Fifteen high quality thesis dealing with computational logic were submitted in the last edition of the award.

As teaching is concerned, an important fact that deserves to be noticed is the high number of courses dealing with LP in Italian universities. From a survey conducted by GULP in 2006 by sending a questionnaire by email to the mailing list of the association, it turned out that over 50 courses (or part of courses) in 20 universities were teaching LP, involving about 1500 students every year. Apart from a relatively small number of dedicated courses, LP was usually taught as part of more “classical” courses, such as courses on Artificial Intelligence, Knowledge representation and reasoning, Programming languages, Theoretical Computer Science, Logics.

Hence, despite of the little consideration that LP is receiving as a tool for real world applications, its educational value does not seem questioned.

## 5 The Future

The training of students and the interaction with other disciplines should be two major objectives of the LP community for the near future.

The community should emphasize, in every conceivable way, the role that LP has played, and still can play, in providing methods and tools to support ideas in related areas. As an example of the feasibility of this cross-fertilization, a forthcoming special issue of the Theory and Practice of Logic Programming journal, edited by Letizia Tanca and Giorgio Orsi, will be devoted to “Logic Programming in Databases: From Datalog to Semantic Web Rules”. As a matter of fact, many people who were once logic programming researchers have moved into other areas of computer science and made major impacts.

In my experience, the LP ideas (and Prolog, in particular) played a fundamental role to open my mind and to stimulate me to face a large number of different topics. Knowledge representation, unification, search strategies, declarative programming, constraints, are all subjects that I met and appreciated through and thanks to LP.

I have been teaching a course on non-conventional programming languages for several years and I find Prolog an irreplaceable tool to prove to students that programming can be faced in a quite different way from what they are accustomed to. I do not think that Prolog should replace C++ or Java, but I

think that it can be a unique vehicle to better understand programming, as well as many other problems and related disciplines.

The forthcoming years of LP in Italy will be probably (and hopefully) characterized by as many as possible efforts:

- to develop activities to improve LP teaching and training;
- to promote the participation of young researchers to these activities (e.g., through summer schools, incentives for students' participation to conferences, etc.);
- to improve the collaboration with other associations of researchers and practitioners in related areas;
- to improve visibility of our association outside of the LP community (e.g., through awards and workshops on specific topics of interest).

The opportunity to celebrate the 50 years of LP in Italy greatly depends on the success of these efforts!

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## A Appendices

### A.1 List of Conferences Organized by GULP

1. GULP (1986), Genova (Italy)
2. GULP (1987), Torino (Italy)
3. GULP (1988), Roma (Italy)
4. GULP (1989), Bologna (Italy)
5. GULP (1990), Padova (Italy)
6. GULP (1991), Pisa (Italy)

7. GULP (1992), Tremezzo (Italy)
8. GULP (1993), Gizzeria (Italy)
9. I GULP-PRODE (1994), Peñíscola (Spain)
10. II GULP-PRODE (1995), Vietri (Italy)
11. III APPIA-GULP-PRODE (1996), San Sebastian (Spain)
12. IV APPIA-GULP-PRODE (1997), Grado (Italy)
13. V APPIA-GULP-PRODE (1998), La Coruña (Spain)
14. VI APPIA-GULP-PRODE (1999), L'Aquila (Italy)
15. VII APPIA-GULP-PRODE (2000), La Habana (Cuba)
16. VIII APPIA-GULP-PRODE (2001), Évora (Portugal)
17. IX APPIA-GULP-PRODE (2002), Madrid (Spain)
18. X APPIA-GULP-PRODE (2003), Reggio Calabria (Italy)
19. I CILC (2004), Parma (Italy)
20. II CILC (2005), Roma (Italy)
21. III CILC (2006), Bari (Italy)
22. IV CILC (2007), Messina (Italy)
23. V CILC (2008), Perugia (Italy)
24. VI CILC (2009), Ferrara (Italy)
25. VII CILC (2010), Rende (Italy)

## A.2 List of Doctoral Schools Organized by GULP

1. 1988 Advanced School on Foundations of Logic Programming, Alghero, Sardinia (organizers: Roberto Barbuti and Maurizio Martelli)
2. 1990 Advanced School on Foundations of Logic Programming, Alghero, Sardinia (organizers: Paolo Mancarella and Giuseppe Sardu)
3. 1996 Int'l Summer School on Advances in Logic Programming, Alghero, Sardinia (organizers: Nicoletta Cocco and Gianfranco Rossi)
4. 1998 Int'l Summer School on Logic Programming Perspectives in Hot Research Areas, Maratea, Basilicata (organizers: Patrizia Asirelli and Piero Bonatti)
5. 2000 First Int'l Summer School in Computational Logic ISCL 2000, Maratea, Basilicata (organizers: Sandro Etalle and Maurizio Gabbrielli)
6. 2002 Second Int'l Summer School in Computational Logic ISCL 2002, Maratea, Basilicata (organizers: Roberto Bagnara and Patricia Hill)

## A.3 Past Presidents of GULP

- Giorgio Levi, Univ. di Pisa
- Roberto Barbuti, Univ. di Pisa
- Maurizio Martelli, Univ. di Genova
- Maurizio Gabbrielli, Univ. di Bologna
- Gianfranco Rossi, Univ. di Parma

#### A.4 The Formal Beginning

The constituent assembly of GULP was held in Pisa on June 18th, 1985. Here is the list of companies, universities and public research centers participating to the constituent assembly.

- CSELT, Torino
- SIPE Optimization, Roma
- Selenia, Roma
- CGD, Roma
- S&M, Pisa
- Digital, Milano
- Olivetti, Ivrea
- ELSAG, Genova
- LIST, Pisa
- INTECS, Pisa
  
- Univ. di Genova
- Univ. di Padova
- Univ. di Pisa
- Univ. di Salerno
- Univ. di Torino
- Univ. di Trento
  
- CNUCE, CNR - Pisa
- IEL, CNR - Pisa
- IMA, CNR - Genova
- ILC, CNR - Pisa
- Scuola Superiore G.Reiss Romoli, L'Aquila
- IDG, CNR - Firenze

The formal date of birth of the association was February 4th, 1986, in Pisa. Members of the first executive committee were:

- Giorgio Levi, Dip. Informatica, Univ. di Pisa (president)
- Giuliana Dettori, IMA, CNR, Genova (secretary)
- Luigi Marcolungo, ISI, Univ. di Padova (vice-president)
- Giovanni Adorni, DIST, Univ. di Genova
- Giovanna Ballaben, Selenia, Roma
- Pietro Jalamoff, Scuola superiore Reiss Romoli, L'Aquila
- Leonardo Roncarolo, ELSAG, Genova
- Gianfranco Rossi, Dip. di Informatica, Univ. di Torino
- Umberto Rugani, INTECS, Pisa
- Genoveffa Tortora, Dip. di Informatica e Applicazioni, Univ. di Salerno