MARCH 1997

INRIA

number 8

INédit

The Newsletter of the French National Institute for Research in Computer Science and Control

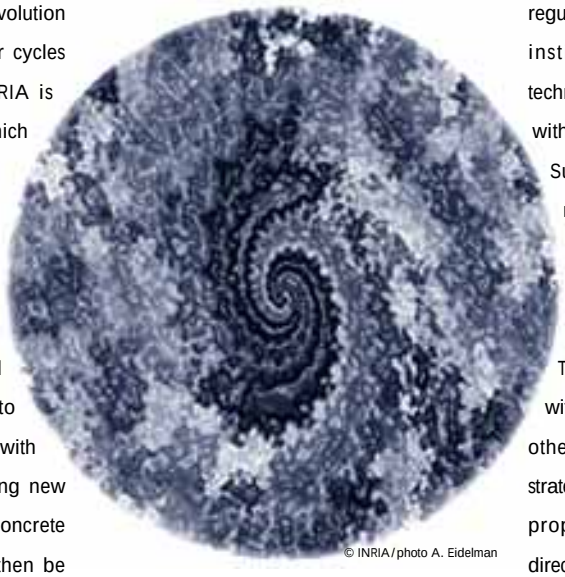
CONTENTS

STRATEGY: NEW DIRECTIONS

How is INRIA to respond to the problems posed by the explosive evolution in science and technology? What should be the extent of its collaboration with enterprises and with other research centres? After some months as the head of the institute, Bernard Larrouturou announces its main lines of action.

"The advent of the Information Society represents for INRIA a fascinating adventure" - of that Bernard Larrouturou is more than ever convinced. The external environment is in the full swing of change, characterized by the rapid acceleration of technological evolution and by the shortening of the transfer cycles from research to new products. INRIA is living through a pivotal period in which the ability to adapt is essential.

Along with scientific excellence, technology transfer remains the principal objective. Several means allow the institute to respond appropriately. Thus, INRIA is open to any new collaboration. In partnership with small or large enterprises, it is finding new research directions. By this means, concrete solutions are developed which will then be validated in the field. In addition, INRIA distributes software used in many areas of application (environment, medicine, publishing...). The creation of enterprises is also a major objective. Over the last twelve years, more than 20 new enterprises have been opened, based on research led by INRIA. This spirit of enterprise will be further enhanced by a soon-to-be-established affiliate *INRIA Transfert*. It will regroup the shares that the institute holds in the companies Ilog, Simulog and O2 Technology, and will allow for financial participation in the creation of new enterprises.



© INRIA / photo A. Eidelman

To remain at the best scientific level, every research or development activity needs to be regularly evaluated. This evaluation allows the institute to remain in phase with the technological and scientific environment and with the needs that this generates for users. Such evaluation will be accompanied by reflection on future directions, with the aid of the institute's academic and industrial partners.

To favour mobility, and to strengthen bonds with the scientific community are some of the other aims. But the originality of this new strategy resides without doubt in another point proposed by the chairman and managing director of INRIA. The institute needs to integrate the social and economic aspects of the advent of the Information Society. This is just a reminder that scientists have their input to offer in this debate which is so important to society.■

event

SUBSIDIARY

Simulog Goes to Rennes

Simulog is present in Rennes since February. With this fifth branch in France, the enterprise is extending its activity into Brittany. A spin-off technology company from INRIA, Simulog is specialized in modelling, simulation and optimization. It works in four areas of activity: scientific computing; dynamic systems and automatic control; simulation and performance evaluation; software engineering. The Simulog group numbers today some 130 persons, including 100 engineers. To start, the opening of the Rennes branch will allow the creation of two new jobs. ■

Simulog - Immeuble Gallium
80, avenue des Buttes de Coesmes - 35700 Rennes
Contact: Jean-Loïc Delhaye, relations with industry, INRIA Rennes
Tel.: +33 2 99 84 75 00 - Jean-Loic.Delhaye@inria.fr

PARALLELISM

Technology Transfer

INRIA participates in the Technology Transfer Node (TTN), called ProHPC. This transfer node is financed in the framework of the European HPCN (High Performance Computing and Networking) programme. The twenty or so TTNs created in Europe aim to make HPCN technology known to enterprises. ProHPC is coordinated by the *École normale supérieure* of Lyon with the participation of Matra, Simulog and INRIA. Every three months, the partners of ProHPC will have to submit new activity proposals (especially feasibility studies) for an average duration of six months to a year. A good opportunity for INRIA projects to transfer their know-how to small and medium enterprises concerned by the possible applications of parallelism to their area of activity. The Caps, Omega, Orion and Remap projects are already involved. ■

Contact: Thierry Priol, Caps project (joint project INRIA-CNRS)
Tel.: +33 2 99 84 72 10 - Thierry.Priol@inria.fr

PORTUGAL

Cooperation Agreement

INRIA and the JNICT (*Junta Nacional de Investigação Científica e Tecnológica*), the Portuguese agency in charge of the financing of research, have signed a cooperation agreement for a duration of three years, in the presence of the Portuguese Minister of Research. It anticipates the creation of a joint consultation group. Calls for proposals may be launched for the implementation of joint research projects, with the support of the French Ministry of Foreign Affairs. INRIA already collaborates with Portuguese research teams, notably in the framework of the European ESPRIT, HCM/TMR and MAST projects. ■

Contact : Marie-Christine Imbert, European liaison officer
Tel.: +33 1 39 63 52 01 - Marie-Christine.Imbert@inria.fr

INTERNATIONAL

Franco-Chinese Laboratory

At the end of January, INRIA and the China's Academy of Sciences created a joint laboratory. It will favour exchanges between Chinese and French scientists and will propose French technology to the Chinese market. A call has been made to put into place bilateral projects involving research institutes or universities from the two countries. Each project will initially be financed for one or two years. Enterprises can be associated with the work of the laboratory by participating contractually in one of its projects. Besides, enterprises can also have contracts with the joint-laboratory for a demonstration platform, the adaptation of a French software product to the Chinese market, etc. ■

Contact: Olivier Monga,
French director of the Franco-Chinese Laboratory
Tel.: +33 1 39 63 53 01 - Olivier.Monga@inria.fr

INTERVIEW

THE COST OF BREAKDOWN

SafeWeb is one of the most significant products of the beginning of this year. Developed by SafeTech, a mixed team from the Dyade partnership (Bull-INRIA), it concerns a middleware product that renders applications fault-tolerant without modifying them. The SafeTech technology and the products derived from it show how the collaboration between an enterprise (Bull) and INRIA, here in the form of GIE (economic interest group), allows the rapid obtaining of an innovative solution.

Éric Bantégnie,
executive vice-president for Dyade

INédit : Dyade is a GIE divided into ten or so actions. What is the advantage of this structure for INRIA and Bull, its partner?

Éric Bantégnie : The GIE structure was chosen because of its flexibility. The fundamental objective of Dyade is to help to valorize technologies, and to rapidly develop innovative products. The basic idea consists in identifying the needs of the industrial partner and those INRIA projects which may be expected to result in a class of industrial products. Dyade is composed of a series of actions, each limited to 18 months to 2 years. This allows a quick 'turn-around' to arrive first on the market with a new solution. The advantage of this type of collaboration is to ally the professionals of the industrialization of products with the environment of research and innovation.

INédit : Where does SafeTech come into this logic?

É. B. : It does in the measure that each action aims to develop a technology or to contribute to it, and to develop a product or a line of products. With SafeTech, we have both a technology and, for the moment, two products. SafeTech is a really innovative technology. It brings in a generic manner a purely software solution to fault tolerance. In the past, it was necessary to have redundant and specialized equipment, which is very expensive because manufactured in small units. Today, with two machines that one could almost buy at the supermarket and with adequate software, one obtains the same result for a cost of around 40,000 FF (about 8,000 US$) instead of 200 to 500,000 FF (40 to 100,000 US$).

INédit : What is the concrete contribution of INRIA in this collaboration?

É. B. : The team is composed of two INRIA PhDs and a researcher from Bull. Once the SafeTech technology was developed, the technology as well as the team that worked on it, were transferred. The two INRIA scientists now work within Bull to develop a complete line of products. SafeWeb, commercialized since last November, allows permanent access to a Web site, even in case of failure of the server. It runs on AIX (the Bull/IBM UNIX) and is currently being ported to Windows NT and Solaris. SafeMaster, the latest product in the range for AIX, allows the administration of network systems with continuity of service. ■

Contact: Éric Bantégnie,
executive vice-president for Dyade
Tel.: +33 1 39 63 56 19
Eric.Bantegnie@dyade.fr

EVOLUTION OF PROTOCOLS

BY GILLES KAHN

The evolution of communication protocols is determinant in the development of the information super-highways. INRIA plays an active role in this area. Scientists of the institute participate in works of standardization and experimentation, and develop tools to validate these various protocols.

Can the Internet make use of satellites? The question is not without interest for surfers. However, the Internet presupposes a bi-directional communication. And with satellites, there's no question of return communications when using low-cost reception antennas. However, this widespread configuration provides an interesting alternative for high-speed Internet access. How then to send a request by the 'traditional' network and obtain a reply via satellite? For Rodeo, INRIA Sophia Antipolis, the reply necessitates a reflection on the algorithms of routing. The research project has therefore launched a working group within the IETF (Internet Engineering Task Forces), baptized UDLR, for UniDirectional Link Routing. Walid Dabbous, head of the Rodeo project, is the president.

By this type of action, INRIA participates in the work of protocol standardization. This is also the case for IPv6, the new version of the Internet Protocol. Francis Dupont, researcher at INRIA Rocquencourt, belongs to the IETF working group on this subject. He is currently writing software for AIX, the Bull/IBM operating system, in the framework of Dyade, a Bull-INRIA partnership. Rodeo has also produced code for the IPv6 protocol which allows the computer in which it is implanted to act as a router. This same team has participated in works that have led to the standardization of the RTP protocol in January 1996. This protocol is intended for the transmission of audio and video data in real-time over the Internet. It has been adopted by most of the major companies developing products requiring the transmission of audio and video.

Gilles Kahn, vice-president for science

© INRIA/photo A. Eidelman

Experimentation is INRIA's second contribution concerning protocols. IVS, software for videoconferencing over the Internet and developed by INRIA, was one the first applications based on RTP and integrating mechanisms for adapting to the state of the network. Rendez-vous (the successor to IVS) and Freephone (audioconferencing software) also integrate RTP and are currently being ported to IPv6. The ATM (Asynchronous Transfer Mode) technology is also the object of experiments within several research projects, including Solidor at Rennes. Along with OST, Solidor has put an ATM network in place to study the problems related to the management of multimedia flow. This new architecture could have applications to virtual reality or video on demand.

Last step: the validation of protocols. In collaboration with Vérilog, Cap Sesa and two organizations, CNET and Célar, the Pampa (Rennes) and Spectre (Rhône-Alpes) projects are studying the feasibility of an industrial utilization of formal methods for the automatic generation of sequences for testing the conformity of protocols. In this context, they have developed TGV (Test Generation with Verification technology). Specification, experimentation, validation: INRIA's work on protocols covers a whole range of activities, from the research stage... to applications. ■

Contact: Gilles Kahn, vice-president for science
Tel.: +33 4 93 65 78 01 · Gilles.Kahn@inria.fr

peeks & pokes

INRIA IN BRIEF

► NEW PROJECTS

INRIA Rhône-Alpes

•Bip: Human Locomotion, Control of Biped Robots and Complex Systems
Contact: Bernard Espiau
Tel.: +33 4 76 61 53 29
Bernard.Espiau@inria.fr

•IS2: Statistical Inference for Industry and Health
Contact: Gilles Celeux
Tel.: +33 4 76 61 53 25
Gilles.Celeux@inria.fr

► NOMINATIONS

Olivier Muron, former director for marketing and technology transfer, and president of the editorial staff of INédit, has been appointed technical advisor for 'Information Super-highways' to the cabinet of François Fillon, Minister for Postal Services, Telecommunications and Space. **Pierre-Louis Lions**, professor at the University Paris-Dauphine, has been appointed president of the INRIA's Evaluation Commission. P.-L. Lions received the Fields medal in 1994.

► DISTINCTION

The Seymour Cray 1996 prize in the "algorithms, architecture and micro-electronics" category has been awarded to **Dominique Lavenier**, researcher for CNRS in the API (Parallel VLSI Architectures) team of IRISA-INRIA Rennes. This prize rewards his work on the design of machines specialized in the analysis of gene sequences. This is the second time API has received this honour. In 1986, the head of the project, Patrice Quinton, was one of the prizewinners.

► IRISATECH

IRISA (which brings together CNRS UPRESA 6074, INRIA Rennes, the University of Rennes 1, and INSA Rennes) has now created 'IrisaTech'. This club includes organizational and industrial partners of IRISA. Its members will have preferred access to various services, such as: the annual technology watch day (on virtual reality in 97), Emergences, the newsletter of the club, "IrisaTech Meetings" (on software development technologies this year), and a dedicated Web site, etc.

Contact: Jean-Loïc Delhaye, relations with industry, INRIA Rennes
Tél. : +33 2 99 84 75 00
Jean-Loic.Delhaye@inria.fr

take note

FRACTALS IN ENGINEERING

The third conference on fractals in engineering will be held in Arcachon, France, from June 25 to 27, 1997. Its goal is to bring together researchers working in all area of fractal analysis. The scope encompasses recent theoretical advances as well as industrial applications. The first and second symposia (1992 and 1994, both in Montreal) were most successful in stimulating relations between the academic and private sectors. This third one hopes to renew this experience.

Two thematic sessions are scheduled per day. Each will be introduced by an invited lecturer with a didactic approach which offers a formal introduction for non-specialists. Several 25-minute periods of contributed talks will follow. A poster session will also be organized.

Benoît Mandelbrot, from Yale University (USA) is honorary Chairman of the scientific committee. Jacques Lévy Véhel, head of the Fractales project at INRIA Rocquencourt, and Claude Tricot, from the École polytechnique of Montréal (Canada), are co-chairmen of the committee. Several topics will be covered during this conference, including dimension theory and its applications to signal processing, multifractal analysis and image processing, IFS theory and finance, but also dynamic systems and applications to computer network traffic analysis, etc. ■

Contact: Florence Balax, public relations department
Tel.: +33 1 39 63 50 53 · FE97@inria.fr
http://www-syntim.inria.fr/fractales/FE97.html

BOOKS

Probabilistic Models for Non-linear Partial Differential Equations

C. Graham, T. Kurtz, S. Méléard, P. Protter, M. Pulvirenti, D. Talay*
Lecture Notes in Mathematics 1627,
Springer-Verlag, 1996, 301 pages

This book deals with probabilistic models for non-linear PDEs and their numerical applications. It focuses on the weak convergence of stochastic integrals, probabilistic interpretation and stochastic particle approximation of equations coming from physics, and the modelling of networks by interacting particle systems. It is expected to be a useful guide for PhD students and young researchers working on stochastic particle methods and on the approximation of PDEs. ■

**Denis Talay is head of the Omega project, at INRIA Sophia Antipolis.*

Protocols for High Speed Networks V

W. Dabbous and C. Diot*
Chapman & Hall, 1997, 248 pages

This book presents a state-of-the-art view of transmission control for multimedia applications and new communication system architectures. It focuses on the problems of achieving efficient transmission of multimedia time-constrained application data using high-speed networks and internetworks. It contains the selected proceedings of the 5th international workshop on protocols for high-speed networks held in October 96. This book will be essential reading for all those working in computer science and engineering departments, especially researchers, engineers and students in university and industry research laboratories. ■

**Walid Dabbous is head of the Rodeo project and Christophe Diot is a researcher in the same project, at INRIA Sophia Antipolis.*

INRIA ORGANIZES

TUTORIALS

► Écoles CEA-EDF-INRIA
Transport de contaminants multiespèces en milieux poreux
Rocquencourt (France)
June 2-6, 1997
Tel.: +33 1 39 63 56 75
symposia@inria.fr

CONFERENCES

► TLCA '97
3rd International Conference on Typed Lambda-Calculi and Applications
Nancy (France)
April 2-4, 1997
Tel.: +33 3 83 59 30 26
Armelle.Savary@inria.fr

► 3rd Cabernet Workshop
Rennes (France)
April 16-18, 1997
Tel.: +33 2 99 84 72 51
Elisabeth.Lebret@inria.fr

► Workshop on Statistical Inference for Stochastic Processes
Rennes (France)
April 24-26, 1997
Tel.: +33 2 99 84 72 51
Elisabeth.Lebret@inria.fr

► SSD '97
5th International Symposium on Spatial Databases
Berlin (Germany)
July 15-18, 1997
Tel.: +49-30 838 75 100
ssd97@inf.fu-berlin.de

► MIC '97
2nd Metaheuristics International Conference
Sophia Antipolis (France)
July 21-24, 1997
Tel.: +33 1 39 63 56 75
symposia@inria.fr

► GREC '97
Second IAPR Workshop on Graphics Recognition
Nancy (France)
August 22-23, 1997
Tel.: +33 3 83 59 30 26
Armelle.Savary@inria.fr

All the tutorials and conferences are on the Web site:
http://www.inria.fr/Colloques/cours-col-eng.html

Directeur de la publication/Publisher: Bernard Larrouturou.
Rédacteur en chef/Editor: Armel Guillet.
Comité de rédaction/Editorial Staff: Albert Benveniste, Christine Genest, Jean-Baptiste Giorgi, Gérard Giraudon, Isabelle Gnaedig-Antoine, Bernard Hidoine, Laurent Kott, Bruno Millon-Frémillon, Gérard Paget, Jacqueline Tchobanian.
Traduction/Translation: JoAnne Marie.
Conception graphique/Design: Vincent Hélye.
Flashage et impression/Printing: Média Graphic - 23, rue des Veyettes - Rennes.
Dépôt légal : 10/03/97- 4000 - 5 issues per year.
ISSN: 1268-3701. Commission paritaire : 3125 ADEP.

To get in touch with INRIA
Scientific Information and Communication Unit (Ucis)
Minitel: 36 16 code INRIA
Tel: +33 1 39 63 57 43
Fax: +33 1 39 63 59 60
E-mail: Ucis@inria.fr
W3 server: http://www.inria.fr
INRIA *IN*édit - BP 105 - 78153 Le Chesnay Cedex - France
Would you like to receive *IN*édit regularly?
Send us your business card to the address above.