A report on LATIN '92:
the first Latin American symposium on
Theoretical INformatics

by Manuel Blum `<blum@cs.berkeley.edu>`

The "first ever" Latin American Symposium on Theoretical Computer Science was held in São Paulo from Monday April 6 to Friday April 10 1992 inclusive. The Proceedings, which were in hand for the start of the conference, appear as Springer–Verlag Lecture Notes in Computer Science 583 under the title LATIN '92, edited by Imre Simon `<is@ime.usp.br>`. The language of the conference was English, and all proceedings papers are in English.

The conference was a resounding success. The program committee accepted less than 1/2 of the submitted papers, and those that were accepted are superb. Speakers tried hard to make their work understandable, and the quality of that work was in general exceptionally high. There was time to make new friends... and time for old friends to renew their acquaintance. LATIN '92 attendees will not soon forget pleasant conversations over bountiful breakfasts, good ideas, dancing at midnight, walks in the rainforest, more good ideas, perilous attempts to cross the streets of São Paulo, and/but most especially the constant churning out of good ideas. In addition, so far as I could make out, no one got mugged, hurt or lost. Paulo Feofiloff and Imre Simon did a grand job of shepherding us through the ins and outs of the conference for this worthwhile and thoroughly delightful week.

Though held in Brazil, this conference was truly international in scope. Participants came from 19 or 20 countries (depending on how you figure it). The 41 speakers (excluding co-authors) currently work in the following 12 countries:

Country	# of speakers
Belgium	1
Brazil	5
Canada	3
Chile	1
France	7
Germany	4
Italy	2
Japan	2
Spain	2
Sweden	4
Switzerland	1
U.S.	9

A number of theoretical computer science areas were strongly represented in this conference. These include automata theory, parallel computation, graphs & graph

algorithms, and number theory & number theoretic algorithms. There were also papers in data structures, distributed computing, and several other areas of theoretical computer science.

A few minor suggestions may be worth mentioning for LATIN'94, which Walter Cunto of Venezuela <walter@caracas1.vnet.ibm.com> is being urged to take on. One is that the above list is missing participation of India and Israel (except for our one Israeli, Yossi Gil). A strong attempt was made to get representation from all countries, but more can/must surely be done. Another suggestion is to get a broader representation of theoretical computer science. Missing to an extent (though not completely) were cryptography, logics of programs, and machine learning. That could be turned around in LATIN '94 by choice of a broader program committee. (I recommend, for example, including Rene Peralta <peralta@miller.cs.uwm.edu> on the next committee to ensure a representation for cryptography.) Let me reemphasize, however, that the above criticisms are relatively minor: this conference was basically, fundamentally and actually really terrific.

Funding for LATIN '92 was obtained from the Brazilian National Science Foundation (CNPq), the São Paulo State Science Foundation (FAPESP), IBM of Brazil, IFIP and UNESCO. SUN Microsystems of Brazil provided flourescent-colored registration bags bearing the inscription LATIN '92/SUN Microsystems. Though these did not appear until the end of our stay, they are much-appreciated mementos of a colorful conference.

The final program appears below. I've inserted personal comments [in brackets] on a small random sampling of the talks and events. Invited speakers are indicated by a star.

MONDAY, APRIL 6

9:00–9:30 OPENING CEREMONY

[*The rector of the university said a few words. Imre Simon thanked Springer–Verlag for publishing the proceedings. This part was short and ended at 9:15 (unusual on a continent where 9:30 usually means 10–10:30).*]

9:30–10:45 *Session 1.* Chair: Cláudio L. Lucchesi (Campinas)

9:30 Vaughan Pratt* (Stanford) *Arithmetic + Logic + Geometry = Concurrency*

[*Pratt builds on Birkhoff's arithmetic of posets to give three views of concurrency, one based on the arithmetic of schedules, the second on the logic of schedule-automaton duality, and the third on the geometry of automata. This paper brings these three views of concurrency together in one place for the first time.*]

10:20 Esther Jennings (Lund) and Lenka Motyčková (Brno Inst. of Tech.) *A distributed algorithm for finding all maximal cliques in a network graph*

10:45–11:15 COFFEE BREAK

11:15–12:30 *Session 2.* Chair: Arnaldo V. Moura (IBM, Rio de Janeiro)

    11:15 Paola Alimonti (Roma 'La Sapienza'), Esteban Feuerstein (Roma 'La Sapienza' and ESLAI, Buenos Aires) and Umberto Nanni (L'Aquila) *Linear time algorithms for liveness and boundedness in conflict-free Petri nets*

[*Feurstein gave an outstanding talk. I think this is the first time I have ever understood—and/or wanted to understand—what Petri nets are about. Previous best algorithms for liveness and boundedness in conflict-free petri nets were quadratic time. This paper brings that down to linear time.*]

    11:40 Anne Brüggemann–Klein (Freiburg) *Regular expressions into finite automata*

    12:05 F. Bossut and B. Warin (Lille) *Automata and pattern matching in planar directed acyclic graphs*

12:30–14:30 LUNCH BREAK

14:30–15:45 *Session 3.* Chair: Nívio Ziviani (UFMG, Belo Horizonte)

    14:30 A. de Luca* (Roma 'La Sapienza') and S. Varricchio (L'Aquila) *Some regularity conditions based on well quasi-orders*

    15:20 Véronique Bruyère (Mons–Hainaut) *Automata and codes with bounded deciphering delay*

[*Short proofs of hard theorems are always impressive. Bruyère's paper gives two short proofs of Schützenberger's surprising theorem that any finite maximal code with bounded deciphering delay is necessarily prefix. The proof works by understanding and using automata with bounded delay.*]

15:45–16:15 COFFEE BREAK

16:15–17:30 *Session 4.* Chair: Eric Goles (U. Chile)

    16:15 M. Bern (Xerox, Palo Alto), Herbert Edelsbrunner (U. of Illinois at Urbana), D. Eppstein (U. of California at Irvine), S. Mitchell (Cornell) and T.S. Tan (U. of Illinois at Urbana) *Edge-insertion for optimal triangulations*

    16:40 Alistair Sinclair (Edinburgh) *Improved bounds for mixing rates of Markov chains and multicommodity flow*

[*This paper provides significantly improved estimates for the mixing rate of several important markov chains, which have been used in the design of algorithms for problems involving matchings in graphs, the Ising model, and almost uniform generation of combinatorial structures. Kudos to Sinclair for his complete explanations, marvelous new theorems, and nice applications.*]

    17:05 Felipe Cucker (Politècnica de Catalunya) and Francesc Rosselló (Illes Balears) *On the complexity of some problems for the Blum, Shub & Smale model*

[*Cucker proves the NP-completeness of some problems from algebra and algebraic geometry in the BSS model of computation. The latter models the kinds of computations done in numerical analysis or computational geometry, where operations are*

in principle performed on real numbers. This paper introduces a natural new class of languages R lying between P and NP that uses probabilistic machines, and exhibits some problems that are in R and therefore not likely to be NP-complete.]

18:30 COCKTAIL PARTY AT THE CLUBE DOS PROFESSORES

TUESDAY, APRIL 7

9:30–10:45 *Session 5.* Chair: Tomasz Kowaltowski (Campinas)

9:30 Manuel Blum* (Berkeley) *Universal statistical tests*

10:20 William I. Gasarch (Maryland) and Katia S. Guimarães (Maryland and Recife) *On the number of components of a recursive graph*

10:45–11:15 COFFEE BREAK

[*Tiny cups of thick black coffee do wonders to encourage neurons to fire; exotic brazilian fruit-juices keep the vocal cords working smoothly as well.*]

11:15–12:30 *Session 6.* Chair: Walter Cunto (IBM, Caracas)

11:15 Svante Carlsson (Luleå) and Jingsen Chen (Lund) *Parallel complexity of heaps and min-max heaps*

11:40 Said Bettayeb (Louisiana State), Bin Cong, Mike Girou and I. Hal Sudborough (U. of Texas at Dallas) *Simulating permutation networks on hypercubes*

[*As pointed out by Akers, Harel and Krishnamurthy, star and pancake networks have advantages over the hypercube: they have sublogarithmic diameter, sublogarithmic vertex degree, and they are regular. This paper investigates imbeddings of these networks into the hypercube.*]

12:05 A.G. Ferreira (São Paulo and Lyon) and S.W. Song (São Paulo) *Achieving optimality for gate matrix layout and PLA folding: a graph theoretic approach*

12:30–14:00 LUNCH BREAK

14:00 VIDEO PRESENTATION ABOUT THE WEDNESDAY EXCURSION

14:30–15:45 *Session 7.* Chair: Yoshiko Wakabayashi (São Paulo)

14:30 Kosaburo Hashiguchi* (Toyohashi) *The double reconstruction conjectures about colored hypergraphs and colored directed graphs*

[*Ulam's conjecture states that any simple graph with more than two nodes can be uniquely reconstructed from the multi-set of one-vertex-deleted subgraphs of the original graph. This paper presents two new conjectures called the double reconstruction conjectures and proves them to imply Ulam's conjecture. This is excellent work presented in an unusual fashion (Hashiguchi talks by laying down transparencies, stepping aside, then explaining what's there without looking at either projection or audience. This has an amazingly calming effect, and none left early though the talk went 20 minutes into overtime.*)]

15:20 Jacques Sakarovitch (Blaise Pascal, Cnrs) *The "last" decision problem for rational trace languages*

15:45–16:15 Coffee break

16:15–17:30 *Session 8.* Chair: Jayme Szwarcfiter (UFRJ, Rio de Janeiro)

16:15 O. Garrido (Lund), S. Jarominek (Warsaw), A. Lingas (Lund), and W. Rytter (Warsaw) *A simple randomized parallel algorithm for maximal f-matchings*

16:40 Oscar Porto (PUC, Rio de Janeiro) *Even induced cycles in planar graphs*

17:05 X. Zhou, S. Nakano, H. Suzuki and T. Nishizeki (Tôhoku) *An efficient algorithm for edge-coloring series-parallel multigraphs*

[*This paper presents an algorithm for finding an edge coloring of series-parallel multigraphs whose complexity is $O(|V|\Delta)$ where V is the vertex set of the graph and Δ is its maximum degree. This is a dramatic improvement of the complexity, $O(|V|\Delta^{64})$, of a recent algorithm of Bodlaender, which held the former "record".*]

Wednesday, April 8

9:00–10:15 *Session 9.* Chair: Sóstenes Lins (UFPe, Recife)

9:00 Daniel D. Sleator* (Carnegie Mellon) *Data structures and terminating Petri nets*

[*Sleator actually gave a nice talk on something different: "Parsing English with a link grammar."*]

9:50 Alair Pereira do Lago (São Paulo) *On the Burnside semigroups $x^n = x^{n+m}$*

[*With this paper, do Lago sets high standards for computer science Master's (!) theses at the University of São Paulo. Building on the work of de Luca and Varricchio, who proved Brzozowski's conjecture for the case of $n > 4$ and $m = 1$, this paper proves the Brzozowski conjecture for $n \geq 4$ and $m \geq 1$. A key new idea is do Lago's concept of stability. The case of $n = 2$ and $n = 3$ are still open.*]

10:15–10:45 Coffee break

10:45–12:00 *Session 10.* Cancelled

11:00 Excursion to Caminho do Mar

[*During this walk, I learned why our hotel was 7 kilometers from the University where the conference talks were given: the original intention had been to combine hotel and conference in a single building, but in the last minutes, the chosen hotel doubled its prices. When that happened, Paulo Feofiloff changed hotels. Touché!*]

Thursday, April 9

9:30–10:45 *Session 11.* Chair: Jeff Shallit (Waterloo)

[*The only exception to the rule of English was in Shallit's introductions. Jeff introduced speakers in some other tongue... Portuguese? Or was it French? Whatever. His efforts were roundly applauded.*]

9:30 Jean-Paul Allouche* (Bordeaux I) *q-Regular sequences and other generalizations of q-automatic sequences*

10:20 Christiane Frougny (Paris VIII and Blaise Pascal) *How to write integers in non-integer bases*

[*Intriguing, and not just to me (Frougny got asked lots of good questions by an obviously very interested audience). It is known that every integer has a finite expansion base θ for $\theta = (1 + \sqrt{5})/2$ (the Golden Ratio). This paper investigates the question: for which θ is the expansion-base-θ of all integers finite?*]

10:45–11:15 Coffee break

11:15–12:30 *Session 12.* Chair: Arnaldo Mandel (São Paulo)

11:15 Joachim Hollman (Royal Inst. of Tech., Stockholm) *On the computation of the Hilbert series*

11:40 Mark Giesbrecht (Toronto) *Factoring in skew-polynomial rings*

12:05 Jaime Gutierrez and Tomas Recio (Cantabria) *Rational function decomposition and Gröbner bases in the parameterization of plane curves*

12:30–14:30 Lunch break

14:30–15:45 *Session 13.* Chair: Siang W. Song (São Paulo)

14:30 Michel Cosnard*, Pascal Koiran and Helene Paugam–Moisy (Lyon) *Complexity issues in neural network computations*

15:20 Eric Goles and Marcos A. Kiwi (U. Chile) *Dynamics of sand-piles games on graphs*

[*This paper analyzes the sequential and parallel dynamics of the one-dimensional sand-pile game of Bak, Tang and Wiesenfeld, which simulates the avalanches produced in a one-dimensional profile of a sand-pile. This was another wonderfully-presented talk (by Goles).*]

15:45–16:15 Coffee break

16:15–17:30 *Session 14.* Chair: Jozef Gruska (Bratislava and Hamburg)

16:15 Rolf Niedermeier and Peter Rossmanith (München) *Unambiguous simulations of auxiliary pushdown automata and circuits*

16:40 Nami Kobayashi (São Paulo) *Properties of recognizable $\mathcal{M}$-subsets of a free monoid*

17:05 Andreas Weber (Frankfurt) *Decomposing a k-valued transducer into k unambiguous ones*

19:30 Symposium Dinner at Churrascaria Porcão

[*Dinner was at a 'churrascaria', a kind of Brazilian grillroom. Waiters walk around plying diners with meats of all kinds. Ever tried capivara, the world's largest rodent? Some think it tastes awful; others can't get enough of it. Von zur Gathen swore that he'd have dinner (not necessarily for love of capivara) at a churrascaria from then on every day that he's in Brazil.*]

9:00–10:15 *Session 15.* Chair: Ricardo Baeza-Yates (U. Chile)

9:00 Arjen K. Lenstra* (Bellcore) *Massively parallel computing and factoring*

[*This paper, based on Lenstra's substantial state-of-the-art experience, surveys the power of fast factoring algorithms when implemented on massively parallel and distributed computers. Besides being enormously informative, this talk was a pleasure on account of Arjen's delightful sense of humor.*]

9:50 J. Gil (British Columbia) and Y. Matias (Maryland and Tel Aviv) *Leaders election without conflict resolution rules—fast and efficient randomized simulations among CRCW PRAMs*

10:15–10:45 COFFEE BREAK

10:45–12:00 *Session 16.* Chair: Joachim von zur Gathen (Toronto)

10:45 Erich Kaltofen* (Rensselaer Polytechnic) *Polynomial factorization 1987–1991*

[*This paper is actually a survey of the last half-decade of research on polynomial factorization, with pointers to surveys of what came before. Very enjoyably written with a really enormous bibliography.*]

11:35 Denis Thérien (McGill) *Circuits constructed with MOD_q gates cannot compute AND in sublinear size*

12:00–14:00 LUNCH BREAK

14:00–15:15 *Session 17.* Chair: Dominique Perrin (Paris VII and Blaise Pascal)

14:00 Jean-Eric Pin* (Bull Research and Development) *On reversible automata*

14:50 David A. Mix Barrington (U. of Massachusetts at Amherst) and Howard Straubing (Boston College) *Complex polynomials and circuit lower bounds for modular counting*

15:15–15:45 COFFEE BREAK

15:45–17:00 *Session 18.* Chair: János Simon (Chicago)

15:45 Ulrich Hertrampf (Würzburg) *Locally definable acceptance types—the three-valued case*

16:10 José D.P. Rolim (Genève) *On the density and core of the complexity classes*

16:35 Danièle Beauquier (Paris VI and Blaise Pascal), Michel Latteux and Karine Slowinski (Lille) *A decidability result about convex polyominoes*

CONCLUSIONS

Judging from personal experience and the substantial feedback I got, LATIN '92 was a great success. Program Chair Imre Simon and Organizing Chair Paulo Feofiloff deserve a round of applause for putting together an exceptional conference.