

## SHORT CURRICULUM VITÆ of PAOLO SERAFINI

### PERSONAL DATA

Birthdate: January 12, 1947  
Birthplace: Monfalcone (GO) - Italy  
Home address: via I Maggio 57 — 34075 Pieris (GO) — Italy  
Final degree: “laurea” in Electronic Engineering, with “maximum cum laude”, March 4, 1971  
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### POSITIONS

2016 → present Retired. Professor Senior.  
2012 → 2016 Professor of Operations Research, Department of Mathematics and Computer Science (now Department of Mathematics, Computer Science and Physics), University of Udine.  
1990 → 2012 Professor of Operations Research, Faculty of Sciences, University of Udine.  
1998 → 2004 Dean, Faculty of Sciences, University of Udine.  
1995 → 1996 Visiting Professor of Operations Research, GSIA (now Tepper School of Business), Carnegie Mellon University, Pittsburgh, PA, USA.  
1985 → 1990 Associate Professor of Operations Research, Faculty of Sciences, University of Udine.  
6/80 → 12/80 Visiting Researcher, Department of Mechanical Engineering, UC Berkeley, USA.  
1978 → 1985 Assistant Professor, Faculty of Sciences, University of Udine.  
1974 → 1978 Lecturer, Udine Branch of the Faculty of Engineering, University of Trieste.  
1972 → 1973 Navy Officer, Ministry of Defense, Rome.  
1971 → 1972 Supervisor of diesel engine tests, FIAT, Turin, Italy.

### MOST RELEVANT PUBLICATIONS

#### Books (as author)

- 1 P. Serafini: *Mathematics to the Rescue of Democracy*, Springer, 2020, 140 pp; ISBN: 978-3-030-38368-8 (ebook), 978-3-030-38367-1 (soft cover).
- 2 P. Serafini: *La Matematica in Soccorso della Democrazia*, Amazon, ISBN-10: 1092343970, [https://www.amazon.com/gp/product/1092343970/ref=dbs\\_a\\_def\\_rwt\\_bibl\\_vppi\\_i3](https://www.amazon.com/gp/product/1092343970/ref=dbs_a_def_rwt_bibl_vppi_i3) (Italian translation of 1, with changes).
- 3 G. Lancia, P. Serafini: *Compact Extended Linear Programming Models*, Springer International Publishing, 2017, DOI: 10.1007/978-3-319-63976-5, in the series: EURO Advanced Tutorials in Operational Research.
- 4 P. Serafini: *Ricerca Operativa*, Springer, Milano 2009, 532 pp (in Italian).
- 5 P. Serafini: *Ottimizzazione*, Zanichelli, Bologna 2000, 548 pp (in Italian).

### Books (as editor)

- 6 F. Luccio, A. Marzollo, P. Serafini: *Mathematics of Computing*, Unesco, Paris, 1993.
- 7 A. Lewandowski, P. Serafini, G. Speranza: *Methodology, Implementation and Applications of Decision Support Systems*, Springer, Vienna, 1991.
- 8 F. Archetti, M. Lucertini, P. Serafini: *Operations Research Models in Flexible Manufacturing Systems*, Springer, Vienna, 1989.
- 9 G. Andreatta, F. Mason, P. Serafini: *Stochastics in Combinatorial Optimization*, World Publishing, Singapore, 1987.
- 10 P. Serafini: *Mathematics of Multi Objective Optimization*, Springer, Vienna, 1985.
- 11 G. Ausiello, M. Lucertini, P. Serafini: *Algorithm Design for Computer System Design*, Springer, Vienna, 1984.

### Papers in journals

- 12 G. Lancia, P. Serafini: “Computational complexity and ILP models for pattern problems in the logical analysis of data”, *Algorithms*, **14**, 2021, p. 1–16, DOI: 10.3390/a14080235.
- 13 S. Crivellaro, L. Sofer, W.R. Halgrimson, R.W. Dobbs, P. Serafini: “Optimized clinical decision making: a configurable Markov model for benign prostatic hyperplasia treatment”, *Urology*, **132**, 2019, p. 183–188, DOI: 10.1016/j.urology.2019.06.022.
- 14 G. Andreatta, C. De Francesco, L. De Giovanni, P. Serafini: “Star partitions on graphs”, *Discrete Optimization*, **33**, 2019, p. 1–18, DOI: 10.1016/j.disopt.2019.01.002.
- 15 F. Pressacco, P. Serafini, L. Ziani: “De Finetti and Markovitz mean variance approach to reinsurance and portfolio selection problems: a comparison”, *Global & Local Economic Review*, **22**, 2018, p. 27–62.
- 16 G. Lancia, F. Rinaldi, P. Serafini: “A facility location model for air pollution detection”, *Mathematical Problems in Engineering*, **2018**, 2018, p. 1–8, DOI: 10.1155/2018/1683249.
- 17 P. Serafini: “An iterative scheme to compute size probabilities in random graphs and branching processes”, *Scientific Programming*, **2018**, 2018, p. 1–6, DOI: 10.1155/2018/3791075.
- 18 F. Ricca, A. Scozzari, P. Serafini: “A guided tour of the mathematics of seat allocation and political districting”, invited chapter in: *Trends in computational social choice*, Ulle Endriss ed., p. 49–68, AI Access, 2017.
- 19 G. Andreatta, C. De Francesco, L. De Giovanni, P. Serafini: “Constrained domatic bipartition on trees”, *Discrete Optimization*, **22**, 2016, p. 372–388, DOI: 10.1016/j.disopt.2016.10.003.
- 20 G. Lancia, P. Serafini: “Deriving compact extended formulations via LP-based separation techniques”, *Annals of Operations Research*, **240**, 2016, p. 321–350, DOI: 10.1007/s10479-015-2012-4. Reprint of C33 in a special collection of surveys.
- 21 G. Lancia, F. Rinaldi, P. Serafini: “Local search inequalities”, *Discrete Optimization*, **16**, 2015, p. 76–89, DOI: 10.1016/j.disopt. 2015.02.003.
- 22 G. Andreatta, L. De Giovanni, P. Serafini: “Optimal shift coloring of pharmacies”, *Computers & Operations Research*, **55**, 2015, p. 88–98, DOI: 10.1016/j.cor.2014.09.009.
- 23 P. Serafini: “Certificates of optimality for minimum norm biproportional apportionments”, *Social Choice and Welfare*, **44**, 2015, p. 1–12, DOI:10.1007/s00355-014-0821-z.
- 24 G. Lancia, P. Serafini: “Deriving compact extended formulations via LP-based separation techniques”, *4OR-A Quarterly Journal of Operations Research*, **12**, 2014, p. 201–234, DOI: 10.1007/s10288-014-0262-7.
- 25 G. Andreatta, L. De Giovanni, P. Serafini: “Optimal shift coloring of trees”, *Operations Research Letters*, **42**, 2014, p. 251–256, DOI: 10.1016/j.orl.2014.04.004.
- 26 P. Serafini: “Classifying negative and positive points by optimal box clustering”, *Discrete Applied Mathe-*

- matics*, **165**, 2014, p. 270–282, DOI: 10.1016/j.dam.2013.05.003.
- 27 M. Monaci, U. Pferschy, P. Serafini: “Exact solution of the robust knapsack problem”, *Computers & Operations Research*, **40**, 2013, p. 2625–2631, DOI 10.1016/j.cor.2013.05.005.
- 28 P. Serafini: “Combinatorial optimization problems with normal random costs”, *Operations Research Letters*, **41**, 2013, p. 126–133, DOI: 10.1016/j.orl.2012.11.014.
- 29 F. Ricca, A. Scozzari, P. Serafini, B. Simeone: “Error minimization methods in biproportional apportionment”, *TOP*, **20**, 2012, p. 547–577, DOI: 10.1007/s11750-012-0252-x.
- 30 P. Serafini, B. Simeone: “Certificates of optimality: the third way to biproportional apportionment”, *Social Choice and Welfare*, **38**, 2012, p. 247–268, DOI: 10.1007/s00355-010-0528-8.
- 31 P. Serafini, B. Simeone: “Parametric maximum flow methods for minimax approximation of target quotas in biproportional apportionment”, *Networks*, **59**, 2012, p. 191–208, DOI 10.1002/net20434.
- 32 P. Serafini: “Allocation of the EU Parliament seats via integer linear programming and revised quotas”, *Mathematical Social Sciences*, **63**, 2012, p. 107–113, DOI: 10.1016/j.mathsocsci.2011.08.006.
- 33 F. Pukelsheim, F. Ricca, A. Scozzari, P. Serafini, B. Simeone: “Network flow methods for electoral systems”, *Networks*, **59**, 2012, p. 73–88, DOI: 10.1002/net.20480.
- 34 F. Pressacco, P. Serafini, L. Ziani: “Mean-variance efficient strategies in proportional reinsurance under group correlation in a gaussian framework”, *European Actuarial Journal*, **1**, 2011, p. 433–454, DOI 10.1007/s13385-011-0020-6.
- 35 G. Lancia, P. Serafini: “An effective compact formulation of the max cut problem on sparse graphs”, *Electronic Notes in Discrete Mathematics*, **37**, 2011, p. 111–116, DOI: 10.1016/j.endm.2011.05.020.
- 36 G. Lancia, F. Rinaldi, P. Serafini: “A time-indexed LP-based approach for min-sum job-shop problems”, *Annals of Operations Research*, **186**, 2011, p. 175–198, DOI: 10.1007/s10479-010-0832-9.
- 37 G. Lancia, P. Serafini: “A set covering approach with column generation for parsimony haplotyping”, *INFORMS J. of Computing*, **21**, 2009, p. 151–166, DOI: 10.1287/ijoc.1080.0285.
- 38 F. Pressacco, P. Serafini: “The origins of the mean-variance approach in finance: revisiting de Finetti 65 years later”, *J. of Decisions in Economics and Finance*, **28**, 2007, p. 19–49. DOI: 10.1007/s10203-007-0067-7.
- 39 A. Pascoletti, P. Serafini: “Differential conditions for constrained nonlinear programming via Pareto optimization”, *J. of Optimization Theory and Applications*, **134**, 2007, p. 399–411. DOI: 10.1007/s10957-007-9216-y.
- 40 P. Serafini: “Dynamic programming and minimum risk paths”, *European J. of Operational Research*, **175/1**, 2006, p. 224–237, DOI:10.1016/j.ejor.2005.03.042.
- 41 P. Serafini: “Linear programming with variable matrix entries”, *Operations Research Letters*, **33**, 2005, p. 165–170, DOI:10.1016/j.orl.2004.04.011.
- 42 P. Serafini: “Asymptotic scheduling”, *Mathematical Programming, B*, **98**, 2003, p. 431–444, DOI:10.1007/s10107-003-0412-8.
- 43 M. Fischetti, G. Lancia, P. Serafini: “Exact algorithms for minimum routing cost trees”, *Networks*, **39**, 2002, p. 1–13.
- 44 E. Balas, G. Lancia, P. Serafini, A. Vazacopoulos: “Job shop scheduling with deadlines”, *J. of Combinatorial Optimization*, **1**, 1998, p. 329–353.
- 45 P. Serafini: “Scheduling jobs on several machines with the job splitting property”, *Operations Research*, **44**, 1996, p. 617–628.
- 46 P. Serafini, G. Speranza: “A decomposition approach in a DSS for a resource constrained scheduling problem”, *European J. of Operational Research*, **79**, 1994, p. 208–219.
- 47 P. Serafini, G. Speranza: “A decomposition approach for a resource constrained scheduling problem”, *European J. of Operational Research*, **75**, 1994, p. 112–135.

- 48 C. Papadimitriou, P. Serafini, M. Yannakakis: “Computing the throughput of a network with dedicated lines”, *Discrete Applied Mathematics*, **42**, 1993, p. 271-278.
- 49 P. Serafini, G. Speranza: “Production scheduling problems in a textile industry”, *European J. of Operational Research*, **58**, 1992, p. 173-190.
- 50 I. Gertsbakh, P. Serafini: “Periodic transportation schedules with flexible departure times”, *European J. of Operational Research*, **50**, 1991, p. 298-309.
- 51 P. Serafini, W. Ukovich: “A mathematical model for periodic scheduling problems”, *SIAM J. on Discrete Mathematics*, **2**, 1989, p. 550-581.
- 52 P. Serafini, W. Ukovich: “A mathematical model for the fixed-time traffic control problem”, *European J. of Operational Research*, **42**, 1989, p. 152-165.
- 53 P. Serafini, W. Ukovich: “An approach towards solving periodic scheduling problems”, *Ricerca Operativa*, **35**, 1985, p. 17-39.
- 54 A. Pascoletti, P. Serafini: “Scalarizing vector optimization problems”, *J. of Optimization Theory and Applications*, **42/4**, 1984, p. 499-524.
- 55 A. Pascoletti, P. Serafini: “An iterative procedure for vector optimization”, *J. of Mathematical Analysis and Applications*, **89**, 1982, p. 95-106.
- 56 A. Pascoletti, P. Serafini: “Comments on cooperative games and vector valued criteria problems”, *IEEE Trans. on Automatic Control*, **21**, 1976, p. 806-808.

#### Papers in proceedings

- 57 G. Lancia, P. Serafini: “The complexity of some pattern problems in the logical analysis of large genomic data set”, in: *Bioinformatics and Biomedical Engineering, Lectures Notes in Computer Science 9656*, F. Ortuño ed., Springer Berlin, 2016, DOI 10.1007/978-3-319-31744-1.
- 58 G. Lancia, F. Rinaldi, P. Serafini: “A unified integer programming model for genome rearrangement problems”, in: *International Conference on Bioinformatics and Biomedical Engineering, Lecture Notes in Computer Science 9043*, F. Ortuño, I. Rojas eds., p. 491-502, Springer Berlin, 2015.
- 59 F. Pressacco, P. Serafini, L. Ziani: “Naive decisions and mean-variance efficiency in proportional reinsurance under group correlation”, in: *XVI Meeting on Risk Theory, 18/09/2009*, Campobasso, University of Molise, Loffredo, p. 213–226, Napoli, 2010.
- 60 F. Pressacco, P. Serafini: “New insights on the mean-variance portfolio selection from de Finetti’s suggestions”, in: *New frontiers in insurance and banking risk management*, Mc Graw Hill, p. 253–270, 2009.
- 61 F. Pukelsheim, F. Ricca, A. Scozzari, P. Serafini, B. Simeone: “Network flow methods for electoral systems”, in: *Proceedings of the International Network Optimization Conference 2009*, Pisa, 26-29 April 2009; revised as paper 33 - Network flow methods for electoral systems.
- 62 P. Serafini: “On some combinatorial properties of PESP”, in: *Proceedings of the 4th Multidisciplinary International Scheduling Conference: Theory and Applications (MISTA 2009)*, J. Blazewicz, Drozdowski, G. Kendall, B. McCollum eds., p. 59–67; 10-12 Aug 2009, Dublin, Ireland.
- 63 A. Pennisi, F. Ricca, P. Serafini, B. Simeone: “Ottimizzazione combinatoria per la progettazione di sistemi elettorali”, in: *Scienza delle decisioni in Italia: Applicazioni della Ricerca Operativa ai problemi aziendali*, ECIG, p. 75–87, Genova, 2008.
- 64 F. Rinaldi, P. Serafini: “Scheduling school meetings”, in: *Practice and Theory of Automated Timetabling VI, Lecture Notes in Computer Science 3867*, E.K. Burke, H. Rudová eds., p. 280–293, Springer Berlin, 2007.
- 65 G. Lancia, F. Rinaldi, P. Serafini: “A Compact Optimization Approach for Job-Shop Problems”, in: *Proceedings of the 3rd Multidisciplinary International Conference on Scheduling: Theory and Applications (MISTA*

- 2007), P. Baptiste, G. Kendall, A. Munier-Kordon, F. Sourd eds., p. 293–300; 28–31 August 2007, Paris, France; revised as paper 36 - A time-indexed LP for job-shop problems.
- 66 A. Pennisi, F. Ricca, P. Serafini, B. Simeone: “Amending and enhancing electoral laws through mixed integer programming: the case of Italy”, in: *Proc. VIII International Conference on Economic Modernization and Social Development*, E. Yashin ed., HSE, Moscow, 2007.
- 67 A. Qualizza, P. Serafini: “A column generation scheme for faculty timetabling”, in: *Practice and Theory of Automated Timetabling V, Lecture Notes in Computer Science 3616*, E.K. Burke, M. Trick eds., p. 161–173, Springer Berlin, 2005, DOI: 10.1007/11593577\_10.
- 68 P. Serafini: “Simulated annealing for multi objective optimization problems”, in: *Multiple Criteria Decision Making: Expand and Enrich the Domains of Thinking and Application*, G.H. Tzeng, U.P. Wen, P.L. Yu eds., p. 283–292, Springer Berlin, 1994.
- 69 P. Serafini, G. Speranza: “Production planning problems in a textile industry”, in: *Proceedings of the Workshop on Algorithms and Complexity*, Rome, October 1990, World Scientific Publishing, Singapore, 1991.
- 70 P. Serafini, W. Ukovich: “A periodic Job Shop model”, in: *Proceedings of the IFAC-CIRP-IFIP-IFORS International Workshop on Decisional Structures in Automated Manufacturing*, Genova, September, 18–21, 1989.
- 71 P. Serafini, W. Ukovich, H. Kirchner, F. Giardina, F. Tiozzo: “Job Shop scheduling: a case study”, in: *Operations Research Models for Flexible Manufacturing Systems*, F. Archetti, M. Lucertini e P. Serafini eds., Springer, Vienna, 1989.
- 72 P. Serafini, W. Ukovich: “Some normative models for automated warehouse problems”, in: *Proceedings of the Third International Conference on Computer Aided Production Engineering*, S.K. Samanta ed., p. 344–351, Ann Arbor June, 1–3, SME, Dearborne, MI, USA, 1988.
- 73 P. Serafini, W. Ukovich: “Operating an automated storage and retrieval system”, in: *Proceedings of the International Conference on Computer Integrated Manufacturing*, p. 29–34, Troy, May, 23–25, 1988, IEEE Computer Society Press, Washington, 1988.
- 74 P. Serafini: “Some considerations about computational complexity for multi objective combinatorial problems”, in: *Recent advances and historical developments of vector optimization*, J. Jahn, W. Krabs eds., p. 222–232, Springer Lecture Notes in Economics and Mathematical Systems n. 294, 1986.
- 75 P. Serafini, W. Ukovich: “Decomposing production scheduling problems in a periodic framework”, in: *Proceedings of the IX International Conference on Production Research*, p. 2094–2099, Cincinnati, Ohio, 1987.
- 76 P. Serafini: “A unified approach for scalar and vector optimization”, in: *Mathematics of Multi Objective Optimization*, P. Serafini ed., p. 89–104, Springer, Vienna, 1985.
- 77 P. Serafini: “Dual relaxation and branch and bound techniques for multi objective optimization”, in: *Interactive decision analysis*, M. Grauer, A. Wierzbicki eds., p. 84–90, Lecture Notes in Economics and Mathematical Systems n.229, Springer, Berlin, 1984.
- 78 P. Serafini: “Ottimizzazione vettoriale”, in: *Metodi e Algoritmi per l’ottimizzazione*, G. Di Pillo e G. Carpaneto eds., p. 367–387, Pitagora, Bologna, 1984.
- 79 P. Serafini: “Convergence of dual variables in interactive vector optimization”, in: *Essays and surveys on multiple criteria decision making*, P. Hansen ed., p. 347–355, Springer, Berlin, 1983.
- 80 P. Serafini: “Reachability of vector optima through dynamic processes”, in: *Multi Objective Decision Making*, S. French et al. eds., p. 35–47, Academic Press, New York, 1983.

Citations (according to Google Scholar) updated September 25, 2021

paper	citations
51 - A mathematical model for periodic scheduling problems	600
68 - Simulated annealing for multi obj. opt. problems	327
54 - Scalarizing vector optimization problems	312
74 - Comp. complexity for multi obj. combinatorial problems	230
45 - Scheduling jobs on several machines with job splitting	118
43 - Exact algorithms for minimum routing cost trees	63
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## APPLIED RESEARCH

### **External contracts for the Department of Mathematics and Computer Science**

2014 – Contract with Overit, Fiume Veneto, (20,000 Euro) for ‘Optimization algorithms to monitor the air particles in a urban area’.

2012 – Contract with Overit, Fiume Veneto, (7,000 Euro) for ‘Design of an algorithm for the assignment of airport ground workers’.

2011 – Contract with Overit, Fiume Veneto, (20,000 Euro) for ‘Simulation and optimization models for electrical network design’.

2009 – Contract with Overit, Fiume Veneto, (30,000 Euro) for ‘Mathematical modeling of shift and logistic planning’.

2005 – Contract with Tecnest, Udine, (26,000 Euro) for ‘Object modeling and local search algorithm embedding for the optimization of complex problems in Supply Chain Planning’.

### **External contracts for CISM Lab**

2016 – Contract with Overit, Fiume Veneto, (8,000 Euro) for ‘Optimal scheduling of maintenance activities over a large area taking into account the traffic variability’.

## TEACHING ACTIVITY

The teaching activity mainly consisted in lectures on Operations Research. Other lectures were devoted to Algorithms and Data Structures, Discrete Mathematics, System Theory and Numerical Analysis.

The lectures in Operations Research were addressed to Computer Science (1982-2016), Mathematics (1996-2003), Economics (2004-2010) and Engineering students (2012-2016) and included the following topics:

Convex analysis. Graph theory. Mathematical programming: Duality theory, Linear programming, Network flows, Matching, Matroids, Dynamic programming, Polyhedral combinatorics, Integer linear programming; Approximation and heuristic algorithms. Algorithms and complexity: Theory of NP-completeness. Queueing theory (M/M and M/G models); Markov decision processes. Scheduling, Project scheduling. Multi criteria analysis. Decision Theory. Game theory.

Whenever possible interactive working examples were provided through the packages *Lingo*, *Mathematica* and *Excel*.

The lectures in Algorithms and Data Structures (2003-2009) were addressed to Computational Biology students.

The lectures in Discrete Mathematics (2000-2015) were addressed to students of the Specialization School for Teaching.

The lectures in System Theory (1978-1982) were addressed to Engineering students.

The lectures in Numerical Analysis (1974-1978) were addressed to Engineering students.

In the academic year 1995-96 the following lectures were delivered at GSIA (now Tepper School of Business), Carnegie Mellon University, Pittsburgh, PA, USA: Dynamic Programming and Stochastic Decision Models; Scheduling I; Scheduling II; Mathematical Programming: A Computer Aided Approach.

## OTHER SELECTED ACTIVITIES

2004	→	2007	Member of the Scientific Council of the Italian Operations Research Group.
1997	→	1998	Member of the Academic Senate of the University of Udine as a Representative of the Scientific Area Mathematics and Physics.
1987	→	today	Member of the Scientific Council of the International Center for Mechanical Sciences (CISM), Udine. Since 2005 Scientific Editor.
1988	→	1992	Project Coordinator of the Unesco project “Applied Mathematics, and Informatics for Developing Countries”.
1986	→	1988	Member of the Administrative Board of the University of Udine.
1982	→	1983	Project Coordinator of the Unesco project “Applied Informatics in Developing Countries”.

### **Schools, Workshops, Symposia organized at CISM**

School on Probabilistic Models in Combinatorial Optimization, October 1-5, 2001. (coordinated with B. G. Siddarth)

School-Workshop on Computational Biology, June 10-19, 1998. (with R. Ravi, G. Lancia)

IC-EATCS Annual Advanced School on Models and Paradigms of Concurrency, September 15-19, 1997. (with C. Palamidessi, F. Honsell)

School-Workshop on Approximate Solutions of Hard Combinatorial Problems, September 16-20, 1996. (with G. Ausiello, M. Protasi)



VI-th International Conference on Stochastic Programming, September 14-18, 1992. (with G. Andreatta, G. Salinetti)

Algorithms and Complexity, June 17-21, 1991. (with F. Luccio)

College on Fundamentals of Computer Science, May 6-June 14, 1991. (with F. Luccio)

CISM-IIASA Summer School on Methodology, Implementation and Applications of Decision Support Systems, September 17-21, 1990. (with A. Lewandowski, M.G. Speranza)

Giornate di Lavoro AIRO 1989, October 2-6, 1989. (with M. Merlino, M.G. Speranza, R. Tadei)

Operation Research Models for Flexible Manufacturing Systems, October 5-9, 1987. (with F. Archetti, M. Lucertini)

Stochastics in Combinatorial Optimization, September 22-26, 1986. (with G. Andreatta, F. Mason)

Mathematics of Multi Objective Optimization, September 3-7, 1984.

Algorithm Design for Computer System Design, July 11-15, 1983. (with G. Ausiello, M. Lucertini)

College on Computer Sciences, May 3-July 8, 1983. (with F. Luccio)