

# WOJCIECH SZPANKOWSKI

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## General Information

Marital Status: Married, two children  
Status in USA: citizen

## Education

1976 M.A. Institute of Telecommunications, Technical University of Gdansk.  
1980 Ph.D. Institute of Telecommunications, Technical University of Gdansk.

## Employment

1976-80	Academic Teacher	Dept. Electrical Engineering, Technical University of Gdansk
1980-83	Assistant Professor	Dept. Electrical Engineering, Technical University of Gdansk
1983-84	Assistant Professor	School of Computer Science, McGill University, Montreal
1985-88	Assistant Professor	Dept. of Computer Sciences, Purdue University
1988-1992	Associate Professor	Dept. of Computer Sciences, Purdue University
1992-	Professor	Dept. of Computer Sciences, Purdue University
2004-	Professor	Dept. Electrical & Computer Eng., Purdue University
2007-	Professor	President of the Republic of Poland
2008-	Saul Rosen Professorship	Purdue University
2010-	Director	NSF STC Center for Science of Information, Purdue U.

## Selected Visiting and Other Positions

1975	Student Training	Kokusai Densin Denwa, Tokyo, Japan
1989	Research Scientist	INRIA, Rocquencourt, France
1990	Visiting Scientist	Technical University of Vienna, Austria
1992-1993	Professeur Invité	INRIA, Rocquencourt, France
1996	Professeur Invité	INRIA, Sophia Antipolis, France
1998	Professeur Invité	INRIA, Rocquencourt, France
1999-2000	Visiting Professor	Electrical Engineering, Stanford University
2000	Visiting Professor	University of Witwatersrand, South Africa
2001	Professeur Invité	Université de Versailles Saint Quentin-en-Yvelines, France
2005	Professeur Invité	Université de Marne-la-Vallée, Paris, France
2006	Erskine Fellow	University of Canterbury, Christchurch, New Zealand
2006-2009	Visiting Scientist	Hewlett-Packard Labs, Palo Alto (summer)
2008-	Director	Institute for Science of Information, Purdue University
2009	Visiting Professor	Ecole Polytechnique, Paris, France.
2010	Visiting Fellow	Isaac Newton Institute, Cambridge, England.

## Research Interests

Analysis and design of algorithms, information theory, bioinformatics, stability problems in distributed systems, modeling of computer and communication networks, multimedia compression, analytic combinatorics, discrete mathematics, and random structures.

## PUBLICATIONS

### Books

1. *Average-Case Analysis of Algorithms on Sequences*, John Wiley & Sons, New York, 2001 (551+ xxii pages).
2. *Analytic Pattern Matching: DNA, Lempel-Ziv, and Trees*, (with P. Jacquet), Cambridge University Press, Cambridge, 2012 (expected).

### Book Chapters:

3. Performance evaluation of multiaccess systems with random access and feedback, Chapter V in *Introduction to Computer Communications*, 159–183, WKL, Warsaw 1984 (in Polish).
4. Towards computable stability criteria for some multidimensional stochastic processes, in *Stochastic Analysis of Computer and Communication Systems* (ed. H. Takagi), 131–172, Elsevier Science Publications B. V. (North-Holland), 1990.
5. Average case analysis of algorithms, Chap. 14 in *Handbook of Algorithms and Theory of Computation* (ed. M. Atallah), 14:1–14:38, CRC Press, Boca Raton 1998; second edition 2009.
6. Analytic Approach to Pattern Matching, Chap. 7 in *Applied Combinatorics on Words* (eds. Lothaire), Cambridge University Press (Encycl. of Mathematics and Its Applications), Cambridge, 2005.

### Refereed Journals:

7. An approximate analysis of a packet switching system with multiple satellite channels (with K. Pawlikowski), *Systems Science*, vol. 5, 299–313, 1979.
8. An approximate analysis of the multiaccess system ALOHA with periodic reservation, *Rozprawy Elektrotechniczne*, vol. XXVII, 279–293, 1981 (in Polish).
9. Some problems in the design of electronic switching exchange (with M. Zientalski), *Telecommunication Review*, 2, 48–52, 1981, (in Polish).
10. Packet switching in multiple radio channels: analysis and stability considerations of a random access system, *Computer Networks*, 7, 17–26, 1983.
11. Analysis and stability considerations of a reservation system, *IEEE Transactions on Communications*, vol. COM-23, 684–692, 1983.
12. Some sufficient conditions for nonergodicity of Markov chains, *Journal of Applied Probability*, 22, 138–147, 1985.
13. Analysis and stability considerations of a random access system radio channels (with A. Kusiuk), *Rozprawy Elektrotechniczne*, vol. XXXI, 265–285, 1985.
14. On an asymptotic analysis of a tree-type algorithm for broadcast communications, *Information Processing Letters*, 23, 135–142, 1986.

15. Bounds for queue lengths in contention packet broadcast systems, *IEEE Transactions on Communications*, vol. COM-34, 1132–1140, 1986.
16. Solution of a linear recurrence equation arising in analysis of some algorithms, *SIAM Journal on Algebraic and Discrete Methods*, 8, 233–250, 1987.
17. On a recurrence equation arising in the analysis of conflict resolution algorithms, *Stochastic Models*, 3, 89–114, 1987.
18. An analysis of a contention resolution algorithm – Another approach, *Acta Informatica*, 24, 173–190, 1987.
19. Closed-network duals of multiqueues with application to token-passing systems (with V. Rego), *Computer Systems and Engineering*, 3, 127–139, 1988.
20. The evaluation of an alternative sum with applications to the analysis of some data structures, *Information Processing Letters*, 28, 13–19, 1988.
21. Some results on  $V$ -ary asymmetric tries, *Journal of Algorithms*, 9, 224–244, 1988.
22. Stability conditions for multidimensional queueing systems with computer applications, *Operations Research*, 36, 944–957, 1988.
23. Some theorems on instability of Markov chains with applications to multiaccess protocols (with V. Rego), *Operations Research*, 36, 958–966, 1988.
24. Some remarks on uniformly bounded Markov chains: Multimodality analysis, *Computers & Operations Research*, 16, 85–99, 1989.
25. Ultimate characterizations of the burst response of an interval searching algorithm (with Ph. Jacquet), *SIAM J. Computing*, 18, 777–791, 1989.
26. The presence of exponentiality in entropy maximised  $M|G1|1$  queues (with V. Rego), *Computers & Operations Research*, 16, 441–449, 1989.
27. On the variance of the external path in a symmetric digital trie (with P. Kirschenhofer and H. Prodinger), *Discrete Applied Mathematics*, 25, 129–143, 1989 (Special issue on “Complexity and Combinatorics”).
28. On the balance property of Patricia tries: External path length viewpoint (with P. Kirschenhofer and H. Prodinger), *Theoretical Computer Science*, 68, 1–17, 1989.
29. Yet another application of binomial recurrence: Order statistics (with V. Rego), *Computing*, 43, 401–410, 1990.
30. Patricia tries again revisited, *Journal of the ACM*, 37, 691–711, 1990.
31. On the height of digital trees and related problems, *Algorithmica*, 6, 256–277, 1991.
32. A characterization of digital search trees from the successful search viewpoint, *Theoretical Computer Science*, 85, 117–134, 1991.
33. Analysis of digital tries with Markovian dependency (with P. Jacquet), *IEEE Transactions on Information Theory*, 37, 1470–1475, 1991.

34. A note on the height of suffix trees (with L. Devroye and B. Rais), *SIAM J. Computing*, 21, 48–53, 1992.
35. Maximum size of a dynamic data structure: Hashing with lazy deletion revisited (with D. Aldous and M. Hofri), *SIAM J. Computing*, 21, 713–732, 1992.
36. Maximum queue length and waiting time revisited: Multiserver G|G|c queues (with Sadowsky), *Probability in the Engineering and Information Science*, 6, 157–170, 1992.
37. Stability of token passing rings (with L. Georgiadis), *Queueing Systems* (Special Issue on “Polling Systems”), 11, 7–33, 1992.
38. Self-alignments in words and their applications (with A. Apostolico), *Journal of Algorithms*, 13, 446–467, 1992.
39. Probabilistic analysis of data structures: A reply to Professor Anderson’s letter, Letter to the Editor, (with P.Kirschenhofer and H. Prodinger), *Theoretical Computer Science*, 106, 395–400, 1992.
40. A probabilistic analysis of a pattern matching problem, (with M. Atallah and P. Jacquet), *Random Structures & Algorithms*, 4, 191–213, 1993.
41. A limiting distribution for the depth in PATRICIA tries (with B. Rais and P. Jacquet), *SIAM J. Discrete Mathematics*, 6, 197–213, 1993.
42. A generalized suffix tree and its (un)expected asymptotic behaviors, *SIAM J. Computing*, 22, 1176–1198, 1993.
43. A note on binomial recurrences arising in the analysis of algorithms, Letter to the Editor, (with H. Prodinger), *Information Processing Letters*, 46, 309–311, 1993.
44. Multidimensional digital searching and some new parameters in tries (with P. Kirschenhofer and H. Prodinger) *International Journal of Foundation of of Computer Science*, 4, 69–84, 1993.
45. Asymptotic properties of data compression and suffix trees, *IEEE Trans. Information Theory*, 39, 1647–1659, 1993.
46. Autocorrelation on words and its applications. Analysis of suffix trees by string-ruler approach (with P. Jacquet), *J. Combinatorial Theory. Ser. A*, 66, 237–269, 1994.
47. Digital trees again revisited: The internal path length perspective (with P. Kirschenhofer and H. Prodinger), *SIAM J. Computing*, 23, 598–616, 1994.
48. Stability conditions for some multiqueue distributed systems: Buffered random access systems, *Advances in Applied Probability*, 26, 498–515, 1994.
49. Average profile and Limiting distribution for a phrase size in the Lempel-Ziv parsing algorithm (with G. Louchard), *IEEE Trans. Information Theory*, 41, 478–488, 1995.
50. A scheduling policy with maximal stability region for ring networks with spatial reuse (with L. Georgiadis and L. Tassioulas), *Queueing Systems*, 19, 131–148, 1995.

51. Asymptotic behavior of the Lempel-Ziv parsing scheme and digital search trees (with P. Jacquet), *Theoretical Computer Science*, 144, 161–197, 1995.
52. Combinatorial optimization problems for which almost every algorithm is asymptotically optimal, *Optimization*, 33, 359–368, 1995.
53. The probability of large queue lengths and waiting times in a heterogeneous multi-server queue. Part I: Tight limits (with J. Sadowsky), *Advances in Applied Probability*, 27, 532–566, 1995.
54. Probabilistic analysis of a string editing problem and its variations (with G. Louchard), *Combinatorics, Probability & Computing*, 4, 143–166, 1995.
55. On asymptotics of certain sums arising in coding theory, *IEEE Trans. Information Theory*, 41, 2087–2090, 1995.
56. On pattern occurrences in a random text (with I. Fudos and E. Pitoura), *Information Processing Letters*, 57, 307–312, 1996.
57. On the distribution for the duration of a randomized leader election algorithm (with J. Fill and H. Mahmoud), *Annals of Applied Probability*, 6, 1260–1283, 1996.
58. Analysis of a splitting process arising in probabilistic counting and other related algorithms (with P. Kirschenhofer and H. Prodinger), *Random Structures & Algorithms*, 9, 379–402, 1996.
59. On the average redundancy rate of the Lempel-Ziv code (with G. Louchard), *IEEE Trans. Information Theory*, 43, 2–8, 1997.
60. Stability analysis of quota allocation access protocols in ring networks with spatial reuse (with L. Georgiadis and L. Tassiulas), *IEEE Trans. Information Theory*, 43, 923–937, 1997.
61. A suboptimal lossy data compression based on approximate pattern matching (with T. Luczak), *IEEE Trans. Information Theory*, 43, 1439–1451, 1997.
62. Analysis of an asymmetric leader election algorithm (with S. Janson), *Electronic J. of Combinatorics*, 4, R17, 1997.
63. Greedy algorithms for the Shortest Common Superstring Problem that are asymptotically optimal (with A. Frieze), *Algorithmica*, 21, 21–36, 1998 (invited after the presentation at *European Symposium on Algorithms*, Barcelona, 1996).
64. Analytical depoissonization and its applications (with P. Jacquet), *Theoretical Computer Science* in “Fundamental Studies” Section, 201, No. 1–2, 1–62, 1998.
65. On asymptotics of certain recurrences arising in universal coding, *Problems of Information Transmission*, 34, No.2, 142–146, 1998.
66. On pattern frequency occurrences in a Markovian sequence (with M. Régnier), *Algorithmica*, 22, 631–649, 1998.
67. Philippe Flajolet’s research in analysis of algorithms and combinatorics, (with H. Prodinger) *Algorithmica*, 22, 366–387, 1998.

68. Average profile for the generalized digital search trees and the generalized Lempel-Ziv algorithm, (with G. Louchard and J. Tang), *SIAM J. Computing*, 28, 935-954, 1999.
69. Quicksort algorithm again revisited (with C. Knessl), *Discrete Mathematics and Theoretical Computer Science*, 3, 43-64, 1999.
70. Entropy computations via analytic depoissonization (with P. Jacquet), *IEEE Trans. Information Theory*, 45, 1072-1081, 1999.
71. Indexing and Mapping of Proteins Using a Modified Nonlinear Sammon's Projection (with I. Apostol), *Journal of Computational Chemistry*, 20, 1049-1059, 1999.
72. Pattern matching image compression: Algorithmic and empirical results (with M. Atallah and Y. Genin), *IEEE Trans. Pattern Analysis and Machine Intelligence*, 21, 618-627, 1999.
73. A note on the asymptotic behavior of the height in b-tries for b Large (with C. Knessl), *Electronic J. of Combinatorics*, 7, R39, 2000.
74. Asymptotic Behavior of the Height in a Digital Search Tree and the Longest Phrase of the Lempel-Ziv Scheme (with C. Knessl), *SIAM J. Computing*, 30, 923-964, 2000.
75. Asymptotic Average Redundancy of Huffman (and other) Block Codes, *IEEE Trans. Information Theory*, 46, 2434-2443, 2000.
76. On Average Redundancy Rate of the Lempel-Ziv Codes with K-error Protocol (with Y. Reznik), *Information Sciences*, 135, 57-70, 2001 (Special issue on "Dictionary Based Compression").
77. Average Profile of the Lempel-Ziv Parsing Scheme for a Markovian Source (with P. Jacquet and J. Tang), *Algorithmica*, 31, 318-360, 2001.
78. 2D-Pattern Matching Image and Video Compression: Theory, Algorithms, and Experiments (with M. Alzina and A. Grama), *IEEE Trans. on Image Processing*, 11, 318-331, 2002.
79. A Universal Predictor Based on Pattern Matching (with P. Jacquet and I. Apostol), *IEEE Trans. Information Theory*, 48, 1462-1472, 2002. (Special issue in memory of Aaron Wyner.)
80. Optimal Versus Randomized Search of Fixed Length Binary Words (with H. Prodinger), *IEEE Trans. Information Theory*, 48, 2614-2621, 2002.
81. Limit Laws for Heights in Generalized Tries and PATRICIA Tries (with C. Knessl), *J. Algorithms*, 44, 63-97, 2002.
82. Analytic Variations on Redundancy Rates of Renewal Processes (with P. Flajolet), *IEEE Trans. Information Theory*, 48, 2911-2921, 2002.
83. The Height of a Binary Search Tree: The Limiting Distribution Perspective (with C. Knessl), *Theoretical Computer Science*, 289, 649-703, 2002.
84. Markov Types and Minimax Redundancy for Markov Sources (with P. Jacquet), *IEEE Trans. Information Theory*, 50, 1393-1402, 2004.

85. Problems on Sequences: Information Theory and Computer Science Interface (with J. Kieffer and E-H. Yang), *IEEE Trans. Information Theory*, 50, 1385-1392, 2004
86. Compact Suffix Trees Resemble PATRICIA Tries: Limiting Distribution of Depth (with P. Jacquet and B. McVey), *Journal of the Iranian Statistical Society*, 3, 139-148, 2004.
87. On the Number of Full Levels in Tries (with C. Knessl). *Random Structures & Algorithms*, 25, 247-276, 2004.
88. Precise Minimax Redundancy and Regrets (with M. Drmota), *IEEE Trans. Information Theory*, 50, 2686-2707, 2004.
89. An Efficient Algorithm for Detecting Frequent Subgraphs in Biological Networks, (with M. Koyuturk, and A. Grama), *Bioinformatics*, Suppl. 1: Proc. 12th Intl. Conf. Intelligent Systems for Molecular Biology (ISMB'04), 200-207, 2004.
90. On Average Sequence Complexity, (with S. Janson and S. Lonardi), *Theoretical Computer Science*, 326, 213-227, 2004.
91. Exploring the Characteristics of Sequences Elements in proximal Promoters of Human Genes, (with M. Bina, P. Wyss, W. Ren, E. Thomas, R. Randhawa, S. Reddy, P. John, E. Pares-Matos, A. Stein, H. Xu, and S. Lazarus), *Genomics*, 84, 929-940, 2004.
92. Reliable Detection of Episodes in Event Sequences (with R. Gwadera and M. Atallah), *Knowledge and Information Systems (KAIS)*, 7, 415 - 437, 2005.
93. Probabilistic Behavior of Asymmetric LC-Tries (with L. Devroye), *Random Structures & Algorithms*, 27, 185-200, 2005.
94. An Optimal DNA Segmentation Based on the MDL Principle, (with W-H. Ren and L. Szpankowski), *Int. J. of Bioinformatics Research and Applications*, 1, 3-17, 2005.
95. Enumeration of Binary Trees and Universal Types (with C. Knessl), *Discrete Mathematics and Theoretical Computer Science*, 7, 313-400, 2005.
96. Hidden Word Statistics (with P. Flajolet and B. Vallée), *Journal of the ACM*, 53, 1-37, 2006.
97. Multicast Tree Structure and the Power Law. *IEEE Trans. Information Theory*, (with C. Adjih, L. Georgiadis and P. Jacquet), 52, 1508- 1521, 2006.
98. Pairwise Alignment of Protein Interaction Networks (with M. Koyuturk, Y. Kim, U. Topkara, S. Subramaniam, A. Grama), *J. Computational Biology*, 13, 182-199, 2006.
99. On the Joint Path Lengths Distribution in Random Binary Trees (with C. Knessl) *Studies in Applied Mathematics*, 117, 109-147, 2006.
100. Detecting conserved interaction patterns in biological networks, (with M. Koyuturk, Y. Kim, S. Subramaniam, and A. Grama) *J. Computational Biology*, 13, 1299-1322, 2006.

101. Finding Biclusters By Random Projections, (with S. Lonardi and Q. Yang), *Theoretical Computer Science*, 368, 217-230, 2006.
102. Assessing Significance of Connectivity and Conservation in Protein Interaction Networks (with M. Koyuturk and A. Grama), *J. Computational Biology*, 14, 747-764, 2007.
103. Partial Fillup and Search Time in LC Tries (with S. Janson), *ACM Trans. on Algorithms*, 3, 44:1-44:14, 2007.
104. Error Resilient LZ'77 Data Compression: Algorithms, Analysis, and Experiments (with S. Lonardi and M. Ward), *IEEE Trans. Information Theory*, 53, 1799-1813, 2007.
105. Randomized Leader Election (with M. Ramanathan, R. Ferreira, S. Jagannathan, and A. Grama) *Distributed Computing*, 19, 403-418, 2007.
106. Identifying Statistical Dependence in Genomic Sequences via Mutual Information Estimates, (with H. Aktulga, I. Kontoyiannis, L. Lyznik, L. Szpankowski, A. Grama) *EURASIP Journal on Bioinformatics and Systems Biology*, Article ID 14741, 11 pages, 2007.
107. Waiting Time Distribution for Pattern Occurrences in a Constrained Sequence, (with V. Stefanov), *Discrete Mathematics and Theoretical Computer Science*, 9, 305-320, 2007.
108. On the Entropy of a Hidden Markov Process, (with P. Jacquet and G. Seroussi), *Theoretical Computer Science*, 395, 203-219, 2008.
109. A One-to-One Code and Its Anti-redundancy, *IEEE Trans. Information Theory*, 54, 4762-4766, 2008.
110. On the Construction of (Explicit) Khodak's Code and Its Analysis (with Y. Bugeaud and M. Drmota), *IEEE Trans. Information Theory*, 54, 5073-5086, 2008.
111. Multiple Choice Tries, (with L. Devroye, G. Lugosi, G. Park), *Random Structures & Algorithms*, 34, 337-367, 2009.
112. Discovering Sequences with Potential Regulatory Characteristics (with M. Bina et al.), *Genomics*, 93, 314-322, 2009.
113. Profile in Tries (with G. Park, H-K. Hwang and P. Nicodeme), *SIAM J. Computing*, 38, 5, 1821-1880, 2009.
114. On the Average Profile of Symmetric Digital Search Trees (with C. Knessl), *Analytic Combinatorics*, 4, article #6, 2009.
115. A Universal Caching Algorithm Based on Pattern Matching (with G. Pandurangan), *Algorithmica*, 57, 62-73, 2010.
116. Tunstall Code, Khodak Variations, and Random Walks (with M. Drmota and Y. Reznik), *IEEE Trans. Information Theory*, 56, 2928 - 2937, 2010.

117. Noisy Constrained Capacity for BSC (with P. Jacquet), *IEEE Trans. Information Theory*, 56, 5412- 5423, 2010.
118. Constrained Pattern Matching (with Y. Choi), *ACM Trans. Algorithms*, 7, 2, 25:1-25:19, 2011.
119. The Expected Profile of Digital Search Trees (with M. Drmota), *J. Combin. Theory, Ser. A*, 118, 1939-1965, 2011.
120. Minimum Expected Length of Fixed-to-Variable Lossless Compression without Prefix Constraints (with S. Verdu), *IEEE Trans. Information Theory*, 57, 4017 - 4025, 2011.
121. Compression of Graphical Structures: Fundamental Limits, Algorithms, and Experiments (with Y. Choi), *IEEE Trans. Information Theory*, 58, 620 - 638, 2012.
122. Counting Markov Types, Balanced Matrices, and Eulerian Graphs, (with P. Jacquet and C. Knessl), *IEEE Trans. Information Theory*, 58, 2012.
123. Minimax Pointwise Redundancy for Memoryless Models over Large Alphabets, (with M. Weinberger). *IEEE Trans. Information Theory*, 58, 2012.

*under journal submission and revision*

124. Deinterleaving Finite Memory Processes via Penalized Maximum Likelihood (with G. Seroussi and M. Weinberger).
125. On a Recurrence Arising in Graph Compression, (with Y. Choi and C. Knessl).
126. A Discrete Divide and Conquer Recurrence, (with M. Drmota).

#### **Refereed Conference Proceedings:**

[Note: Many conference papers are preliminary versions of journal papers.]

1. Simulation and analysis of satellite packet switching computer networks (with K. Ono and Y. Urano), *Proceedings of International Conference on Computer Communication*, Tokyo, 1978, pp. 609–615.
2. Performance of multiaccess systems with random access-control disciplines, *Proceedings of International Symposium on Computer Networks and Teleprocessing Systems COMNET '81*, Budapest, 1981, pp. 5.92–5.104.
3. An optimization of a concentrated ALOHA system basing on Poisson approximate analysis, *Proceedings of International Conference on Remote Data Transmission*, Karlove Vary, 1981, pp. VI.16–VI.19.
4. Analysis and stability considerations of a concentrated ALOHA system, *Proc. of the Inter. Symposium on Computer Performance Modeling, Measurement and Evaluation, PERFORMANCE'81*, (ed. F.J. Kylstra), Amsterdam, 1981, pp. 33–49.
5. Upper and lower bounds for queue lengths in buffered heterogeneous ALOHA system, *Proc. of the Hawaii International Conference on Systems Science*, Honolulu, 1983, pp. 267–275.

6. Ergodicity aspects of multidimension Markov chains with application to communication systems analysis, *Proc. of the International Seminar on Modeling and Performance Evaluation Methodology*, Paris, 1983, vol. 3, pp. 235–258.
7. Analysis of a reservation system with multiple broadcast channels, *Proc. of the International Computing Symposium*, (ed. H.S. Schneider), Nurnberg, 1983, pp. 234–249.
8. Approximate methods for analysis and design of ALOHA-type systems with multiple satellite channels, *Proc. of International Symposium, Satellite & Computer Communications*, (ed. J. Grange), Versailles, 1983, pp. 117–134.
9. Performance evaluation of a reservation protocol for multiaccess system, *Proc. of Inter. Symposium PERFORMANCE'83*, (eds. A.K. Agrawala and S.K. Tripathi), University of Maryland, 1983, pp. 377–394.
10. A multiqueue system: bounds and approximations, *Proc. of Intern. Symposium on the Performance of Computer Communications Systems*, (eds. W. Bux and H. Rudin), Zurich, 1984, pp. 349–366.
11. A queueing model with interrupted servers and its applications (with A. Kusiuk), *Proc. of Inter. Conference on Modeling Techniques and Tools for Performance Analysis*, Paris, 1984, pp. 539–553.
12. Ergodicity aspects of multidimensional Markov chains with applications to computer system analysis, in *Modeling and Performance Evaluation Methodology*, (eds. F. Baccelli and G. Fayolle), Lecture Notes in Control and Information Sciences, 60, Springer-Verlag, 1984, pp. 297–319.
13. Analysis of a recurrence equation arising in stack-type algorithms for collision-detecting channels, *Proceedings of Intern. Seminar on Computer Networking and Performance Evaluation*, (eds. T. Hasegawa, H. Takagi and Y. Takahashi), Tokyo, 1985, pp. 399–410.
14. Instability conditions arising in analysis of some multiaccess protocols (with V. Rego), *Proc. of 24-th Annual Allerton Conference on Communications, Control, and Computing*, University of Illinois at Urbana-Champaign, 1986, pp. 854–864.
15. How much on the average is the Patricia trie better, *Proc of 24-th Annual Allerton Conference on Communications, Control, and Computing*, University of Illinois at Urbana-Champaign, 1986, pp. 314–323.
16. Performance evaluation of interval-searching conflict resolution algorithms, *IEEE International Symposium on Information Theory*, Abstracts. p. 35, Ann Arbor, 1986.
17. Heterogeneous local networks supporting scientific and knowledge processing based upon a token passing ADMA system (with D. Marinescu and V. Rego), *Proc. of Computer Networking Symposium*, Washington, 1986, pp. 38–45.
18. Stability, bounds and approximation in asymmetric buffered ALOHA-type system, *Proc. of 25-th IEEE Conference on Decision and Control*, Athens, 1986, pp. 1722–1727 (invited paper).

19. Average complexity of additive properties for multiway tries: A unified approach, *Proc. of Colloquium on Trees in Algebra and Programming*, Lecture Notes in Computer Science, 249, 1987, pp. 13–25.
20. Availability driven multiple access network architecture (with D. Marinescu and V. Rego), *Proc. of INFO'87* Los Angeles, 1987, pp. 588–596.
21. Asymptotic and other approximations of Gallager-type conflict resolution algorithms, *Proc. of Third International Conference on Data Communication Systems and Their Performance*, Rio de Janeiro (eds. I. de Moraes, E. de Souza e Silva and I. Soares), 1987, pp. 297–312.
22. Modeling of an availability driven computer network architecture, *Proc. of ACM Symposium on the Simulation of Computer Networks*, Colorado Springs, 1987, pp. 2–10.
23. On variance of the external path length in a binary digital tree (with. P. Kirschenhofer and H. Prodinger), *Combinatorics and Complexity Conference*, University of Illinois at Chicago, 1987, Abstracts pp. 53–54.
24. Two problems on the average complexity of digital trees, *Proceedings of International Symposium PERFORMANCE'87*, (ed. P.J. Courtois and G. Latouche), Brussels, 1987, pp. 189–208.
25. How well are binary search trees balanced (with V. Rego), *25-th Annual Allerton Conference on Communication, Control and Computing*, University of Illinois at Urbana-Champaign, 1987, pp. 66–71.
26. Stability conditions in a multiqueue system with applications to the analysis of communication networks (with V. Rego), *25-th Annual Allerton Conference on Communication, Control and Computing*, University of Illinois at Urbana-Champaign, 1987, pp. 1099–1100.
27. On the quality of approximation for high speed rings (with V. Rego), *Proc. An International Symposium on High Performance Computer Systems*, (ed. E. Gelenbe), Paris 1987, pp. 179–193.
28. Necessary and sufficient stability conditions for some distributed systems (with V. Rego), *1988 International Symposium on Information Theory*, Abstracts. p. 128, Kobe 1988.
29. On an alternative sum use useful in the analysis of some data structures *Proc. Scandinavian Workshop on Algorithm Theory*, Lecture Notes in Computer Science, 318, (eds. R. Karlsson and A. Lingas), Springer-Verlag 1988, pp. 120–128.
30. Do we really need to balance Patricia tries (with P. Kirschenhofer and H. Prodinger), *International Conference on Automata, Languages, and Programming (ICALP'88)*, Lecture Notes in Computer Science, 317, (eds. T. Lepisto and A. Saloman), Springer-Verlag 1988, pp. 302–316.
31. Ultimate characterizations of interval searching algorithms for distributed systems (with P. Jacquet), *Proc. International Seminar on Performance of Distributed and*

- Parallel Systems*, (eds. T. Hasegawa, H. Takagi, Y. Takahashi), Kyoto 1988, pp. 319–334.
32. Digital search trees – Further results on a fundamental data structures (with P. Kirschenhofer and H. Prodinger), *Proc. of 11-th World Computer Congress*, (ed. Ritter), 1989, pp. 443–447.
  33. A safe state approach to real-time system scheduling (with D. Marinescu), *Sixth IEEE Workshop on Real-Time Operating Systems and Software*, Pittsburgh 1989, pp. 54–60.
  34. Digital data structures and order statistics, *Workshop on Algorithms and Data Structures*, Lecture Notes in Computer Science, 382 (eds. F. Dehne, J. Sack and N. Santoro), Springer-Verlag 1989, pp. 206–217.
  35. On the maximum queue length with applications to data structures analysis, *27-th Annual Allerton Conference on Communication, Control and Computing*, University of Illinois at Urbana-Champaign, 1989, pp. 263–272.
  36. On the analysis of the tail queue length and waiting time distributions of a  $G|G|c$  queue (with J. Sadowsky), *Proceedings of the International Symposium PERFORMANCE'90*, (ed. I. Mitrani and P. King), Edinburgh, 1990, pp. 93-107.
  37. On some combinatorial optimization: Bottleneck and capacity assignment problems, *28-th Annual Allerton Conference on Communication, Control and Computing*, University of Illinois at Urbana-Champaign, pp. 92-101, 1990.
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  39. A typical behavior of some data compression schemes, *Proc. of Data Compression Conference*, Snowbird, pp. 247-256, 1991.
  40. Towards stability criteria for multidimensional distributed systems: The buffered ALOHA case, *International Symposium on Information Theory*, Abstracts p.80, Budapest 1991.
  41. What can we learn about suffix trees from independent tries ? (with P. Jacquet), *1991 Workshop on Algorithms and Data Structures*, Lecture Notes in Computer Science, 519 (eds. F. Dehne, J. Sack and N. Santoro), Springer-Verlag 1991, pp. 228–229.
  42. Combinatorial optimization through order statistics, *Proc. Second International Symposium on Algorithms*, Taipei, Taiwan, Lecture Notes in Computer Science, 557 (eds. W.L. Hsu and R.C.T. Lee), pp. 208-217, Springer-Verlag 1991.
  43. (Un)Expected behavior of typical suffix trees, *Third Annual ACM-SIAM Symposium on Discrete Algorithms*, 1992, pp. 422-431.
  44. How to count quickly and accurately: A unified analysis of probabilistic counting and other related problems, (with P. Kirschenhofer and H. Prodinger) *International Conference on Automata, Languages, and Programming (ICALP'92)*, Vienna, LNCS, No. 623, pp.211-222, 1992.

45. Probabilistic analysis of generalized suffix trees, *Proc. Combinatorial Pattern Matching*, Tucson, Lecture Notes in Computer Science, 644, (eds. A. Apostolico, M. Crochemore, Z. Galil, U. Manber), pp. 1-14, Springer-Verlag 1992.
46. Pattern matching with mismatches: A probabilistic analysis and a randomized algorithm, (with M. Atallah, P. Jacquet), *Proc. Combinatorial Pattern Matching*, Tucson, Lecture Notes in Computer Science, 644, (eds. A. Apostolico, M. Crochemore, Z. Galil, U. Manber), pp. 27-40, Springer-Verlag 1992.
47. Analysis of string edit problem in a probabilistic framework, (with G. Louchard), *Proc. Combinatorial Pattern Matching*, pp. 152-163, Padova, 1993.
48. Stability analysis of fair policies in ring networks with spatial reuse (with L. Georgiadis and L. Tassiulas), *Proc. 31-st Annual Allerton Conference on Communication, Control, and Computing*, (invited talk) University of Illinois at Urbana-Champaign, pp. 1109-1118, 1993.
49. A functional equation often arising in the analysis of algorithms, (with P. Jacquet), *Proc. 26th ACM Symposium on Theory of Computing (STOC'94)*, Montreal, pp. 780-789, 1994.
50. Stability analysis for yet another class of multidimensional distributed systems (with L. Georgiadis), *Proc. 11th Intern. Conf. on Analysis and Optimization Systems. Discrete Event Systems*, Sophia-Antipolis, (Eds. G. Cohen and J.M. Quadrant), Springer Verlag Lecture Notes on Control and Information Science, vol 199, pp. 523-530, 1994.
51. A lossy data compression based on string matching: Preliminary Analysis and Suboptimal algorithms (with T. Luczak), *Proc. Combinatorial Pattern Matching*, Asilomar, California, pp. 102-112, 1994 (also INRIA TR-2211, 1994).
52. Generalized Lempel-Ziv Parsing Scheme and its Preliminary Analysis of the Average Profile (with G. Louchard), *Proc. Data Compression Conference*, pp. 262-271, Snowbird, 1995.
53. Asymptotic behavior of the Lempel-Ziv parsing scheme and digital search trees (with P. Jacquet), long paper (10% acceptance rate) in *1995 International Symposium on Information Theory*, Abstract pp. 14, Whistler, Canada, 1995.
54. Stability analysis of quota allocation access protocols in ring networks with spatial reuse (with L. Georgiadis and L. Tassiulas), *1995 International Symposium on Information Theory*, Abstracts pp. 80, Whistler, Canada, 1995.
55. A lossy data compression based on an approximate pattern matching (with T. Luczak), *1995 International Symposium on Information Theory*, Abstract pp.109, Whistler, Canada, 1995.
56. On generalized digital search trees with applications to a generalized Lempel-Ziv algorithm (with J. Tang), *33-st Annual Allerton Conference on Communication, Control, and Computing*, pp. 891-900, Allerton Park, 1995.
57. Average redundancy rate of the Lempel-Ziv code (with G. Louchard), *Proc. Data Compression Conference*, 92-101, Snowbird, 1996.

58. Pattern matching image compression, (with M. Atallah and Y. Genin), Abstract in *Proc. Data Compression Conference*, p. 421, Snowbird, 1996.
59. A pattern matching approach to image compression, (with M. Atallah and Y. Genin), *Proc. International Conference on Image Processing*, vol. II. 349-352, Lausanne, 1996.
60. Greedy algorithm for the Shortest Common Superstring Problem that are asymptotically optimal! (with A. Frieze), *European Symposium on Algorithms*, Springer LNCS, No. 1136, 194-207, Barcelona 1996; also *1997 International Symposium on Information Theory*, p.39, Ulm, 1997.
61. Pattern Matching Image Compression with Prediction Loop, (with D. Arnaud), Abstract in *Proc. Data Compression Conference*, Snowbird, 1997.
62. On pattern frequency occurrences in a Markovian sequence, (with M. Regnier), *1997 International Symposium on Information Theory*, p. 311, Ulm, 1997.
63. Average profile of the Lempel-Ziv scheme for a Markovian Source (with J. Tang), *1997 International Symposium on Information Theory*, p. 310, Ulm, 1997.
64. Analytical Depoissonization and Its Applications to Combinatorics and Analysis of Algorithms, (with P. Jacquet), *Proc. Formal Power Series and Algebraic Combinatorics*, pp. 289–300, Universitaet Wien, Vienna, 1997.
65. On the approximate pattern occurrence in a text (with M. Regnier) *Proc. Compression and Complexity of SEQUENCE'97*, IEEE Computer Society, pp. 253-264, Positano 1997.
66. On the Collapse of the  $q$ -Gram Filtration (with E. Sutinen), *Proc. of Int. Conf. FUN with Algorithms*, pp. 178-193, Elba, Italy 1998.
67. On Asymptotics of the Minimax Redundancy Arising in a Universal Coding, *1998 International Symposium on Information Theory*, pp. 349, Boston 1998.
68. Entropy Computations for Discrete Distributions: Towards Analytic Information Theory (with P. Jacquet), *1998 International Symposium on Information Theory*, pp. 373, Boston 1998.
69. Complexity of sequential pattern matching algorithms (with M. Régnier), *Proc. Randomization and Approximate Techniques in Computer Science, RANDOM'98*, LCNS No. 1518, 187-199, Barcelona 1998.
70. Quicksort algorithm again revisited (with C. Knese), *Proc. Randomization and Approximate Techniques in Computer Science, RANDOM'98*, LCNS No. 1518, 346-356, Barcelona 1998.
71. 2D-Pattern Matching Image and Video Compression: Preliminary Results, (with M. Alzina and A. Grama), *Proc. Data Compression Conference*, pp. 424-433, Snowbird, 1999.
72. Height in a Digital Search Tree and the Longest Phrase of the Lempel-Ziv Scheme (with C. Knese), *Proc. 11th ACM-SIAM Symposium on Discrete Algorithms*, pp. 187-196, San Francisco 2000.

73. Heights in Generalized Tries and PATRICIA Tries (with C. Knessl), *LATIN'2000*, Punta del Este, Lecture Notes in Computer Science, No. 1776, 298-307, 2000.
74. On Average Redundancy Rate of the Lempel-Ziv Codes with K-error Protocol (with Y. Reznik), *Proc. Data Compression Conference*, pp. 373-382, Snowbird, 2000.
75. Summary Structures for Frequency Queries on Large Transaction Sets (with D-Y. Yang, A Johar, A. Grama), *Proc. Data Compression Conference*, pp. 420-429, Snowbird, 2000.
76. Analytic Variations on Redundancy Rates of Renewal Processes (with P. Flajolet), *2000 International Symposium on Information Theory*, pp. 499, Sorento, Italy, June 2000.
77. Asymptotic Average Redundancy of Huffman (and Shannon-Fano) Block Codes, *2000 International Symposium on Information Theory* pp. 370, Sorento, Italy, June 2000.
78. A Universal Predictor Based on Pattern Matching: Preliminary Results (with P. Jacquet and I. Apostol), *Mathematics and Computer Science : Algorithms, Trees, Combinatorics and Probabilities*, (eds. D. Gardy and A. Mokkaem), 75-85, Birkäuser, Basel, 2000.
79. Hidden Pattern Statistics (with P. Flajolet, Y. Guivarc'h, and B. Vallée), *ICALP 2001*, Crete, Greece, LNCS 2076, 152-165, 2001.
80. Is the Internet Fractal? (with C. Adjih, L. Georgiadis and P. Jacquet), *Proc. SODA 2002*, San Francisco, 338-345, 2002.
81. Generalized Shannon Code Minimizes the Maximal Redundancy (with M. Drmota), *Proc. LATIN'02*, Springer LNCS 2286, 306-318, Cancun, Mexico, 2002.
82. Precise Average Redundancy of an Idealized Arithmetic Coding (with M. Drmota and H-K. Hwang), *Data Compression Conference*, 222-231, Snowbirds, 2002.
83. Improved Behaviour of Tries by the "Symmetrization" of the Source (with Y. Reznik), *Data Compression Conference*, 372-381, Snowbirds, 2002.
84. Optimal Versus Randomized Search of Fixed Length Binary Words (with H. Prodinger), *2002 International Symposium on Information Theory*, Abstracts, 205, Lausanne 2002.
85. On the Analysis of Variable-to-Variable Length Codes (with S. Savari), *2002 International Symposium on Information Theory*, Abstracts, 176, Lausanne 2002.
86. The Precise Minimax Redundancy (with M. Drmota.), *2002 International Symposium on Information Theory*, Abstracts, 35, Lausanne 2002.
87. Semi-Discrete Matrix Transform (SDD) for Image and Video Compression (with S. Zyto and A. Grama), in *Process Coordination and Ubiquitous Computing*, (Eds. D. Marinescu and C. Lee) 249-259, Kluwer, 2002.

88. A Combinatorial Problem Arising in Information Theory: Precise Minimax Redundancy for Markov Sources, (with P. Jacquet), *Colloquium on Mathematics and Computer Science: Algorithms, Trees, Combinatorics and Probabilities*, University of Versailles-St Quentin, 311-328, Birkäuser, Basel, 2002.
89. Joint Source-Channel LZ'77 Coding (with S. Lonardi), *Data Compression Conference*, 273-282, Snowbird, 2003.
90. Asymptotic Average Redundancy of Adaptive Block Codes, (with Y. Reznik) *2003 International Symposium on Information Theory*, p.79, Yokohama, 2003.
91. Precise Minimax Redundancy for Markov Sources, (with P. Jacquet), *2003 International Symposium on Information Theory*, p.78, Yokohama, 2003.
92. An Optimal DNA Segmentation Based on the MDL Principle, (with W-H. Ren and L. Szpankowski), *IEEE Computer Society Bioinformatics Conference*, 541-546, Stanford, 2003.
93. Algorithms for Bounded-Error Correlation of High Dimensional Data in Microarray Experiments, (with M. Koyuturk, and A. Grama), *IEEE Computer Society Bioinformatics Conference*, 575-580, Stanford, 2003.
94. How Predictable Are Biological Sequences? (with I. Apostol and P. Jacquet), *2003 European Conference on Computational Biology*, 531-532, Paris, 2003.
95. Reliable Detection of Episodes in Event Sequences, (with R. Gwadera and M. Atallah), *Third IEEE International Conference on Data Mining*, 67-74, Florida, 2003.
96. Analysis of a Randomized Selection Algorithm Motivated by the LZ'77 Scheme (with M. Ward), *Proc. of the First Workshop on Analytic Algorithmics and Combinatorics (ANALCO04)*, 153-160, New Orleans, 2004.
97. On the Entropy of a Hidden Markov Process, (with P. Jacquet and G. Seroussi), *Data Compression Conference*, 362-371, Snowbird, 2004.
98. An Efficient Algorithm for Detecting Frequent Subgraphs in Biological Networks, (with M. Koyuturk, and A. Grama), *ISBM/ECCB*, Glasgow, 2004.
99. Finding Biclusters by Random Projections, (with S. Lonardi and Q. Yang), *Proc. Combinatorial Pattern Matching*, Istanbul, LNCS 3109, 102-116, 2004.
100. On the Average Sequence Complexity, (with S. Janson and S. Lonardi), *Proc. Combinatorial Pattern Matching*, Istanbul, LNCS 3109, 74-88, 2004.
101. Variations on Khodak's Variable-to-Variable Codes, (with M. Drmota), *Proc. 42nd Annual Allerton Conference on Communication, Control, and Computing*, 1438-1447, 2004.
102. Error Resilient LZ'77 Scheme and Its Analysis, (with S. Lonardi and M. Ward), *Proc. 2004 International Symposium on Information Theory*, p. 56, Chicago, 2004.
103. Biclustering Gene-Feature Matrices for Statistically Significant Dense Patterns (with M. Koyuturk, and A. Grama), *IEEE Computer Society Bioinformatics Conference*, 480-483, Stanford, 2004.

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105. Towards a Complete Characterization of Tries, (with G. Park), *SIAM-ACM Symposium on Discrete Algorithms*, 33-42, Vancouver, 2005.
106. Enumeration of Binary Trees, Lempel-Ziv'78 Parsings, and Universal Types, (with C. Knessl), *Proc. of the Second Workshop on Analytic Algorithmics and Combinatorics (ANALCO05)*, 222-229, Vancouver, 2005.
107. Markov Models for identification of Significant Episodes (with R. Gwadera and M. Atallah), *2005 SIAM Conference on Data Mining, (SDM-05)*, 404-414, Newport Beach, California, April 2005.
108. Pairwise Local Alignment of Protein Interaction Networks Guided by Model Evolution, (with M. Koyuturk, and A. Grama), *Proc. RECOMB'05*, Springer LNBI 3500, 48-65, 2005.
109. Analysis of the Multiplicity Matching Parameter in Suffix Trees (with M. Ward), *2005 Conference on Analysis of Algorithms, DMTCS Proc*, 307-322, Barcelona, 2005.
110. Analysis of Biclusters with Applications to gene Expression Data (with G. Park), *2005 Conference on Analysis of Algorithms, DMTCS Proc*, 267-274, Barcelona, 2005.
111. One-to-One Code and Its Anti-Redundancy, *2005 International Symposium on Information Theory*, 1526-1528, Adelaide, 2005.
112. A Universal Caching Algorithm Based on Pattern Matching (with G. Panduranggan), *2005 International Symposium on Information Theory*, 1151-1155, Adelaide, 2005
113. Partial Fillup and Search Time in LC Tries, (with S. Janson), *Proc. of the Third Workshop on Analytic Algorithmics and Combinatorics (ANALCO06)*, Miami, 2006.
114. Binary Trees, Left and Right Paths, WKB Expansions, and Painleve Transcendents (with C. Knessl), *Proc. of the Third Workshop on Analytic Algorithmics and Combinatorics (ANALCO06)*, Miami, 2006.
115. Assessing of Coonectivity and Conservation in Protein Interaction Networks, (with M. Koyuturk, and A. Grama), *RECOMB 2006*, LNBI 3909, 45-59, 2006.
116. Error-Resilient LZW Data Compression, (with Y. Wu and S. Lonardi), *Data Compression Conference*, 193-202, Snowbird, 2006.
117. On  $(d,k)$  Sequences Not Containing a Given Word, (with P. Jacquet) *IEEE Intern. Symposium on Information Theory*, 1486-1489, Seattle, 2006.
118. Precise Asymptotic Analysis of the Tunstall Code (with M. Drmota, Y. Reznik, and S. Savari) *IEEE Intern. Symposium on Information Theory*, 2334-2337, Seattle, 2006.
119. Multiple Choice Tries and Distributed Hash Tables (with L. Devroye, G. Lugosi, G. Park) *SIAM-ACM Symposium on Discrete Algorithms (SODA 2007)*, 891-899, New Orleans, 2007.

120. Noisy Constrained Capacity (with P. Jacquet and G. Seroussi), *2007 International Symposium on Information Theory*, 986-990, Nice, 2007.
121. Pattern Matching in Constrained Sequences, (with Y-W. Choi) *2007 International Symposium on Information Theory*, 2606-2610, Nice, 2007.
122. Statistical Dependence in Biological Sequences, (with H. Aktulga, I. Kontoyiannis, L. Lyznik, L. Szpankowski, A. Grama) *2007 International Symposium on Information Theory*, 2676-2680, Nice, 2007.
123. On the Ehrenfeucht-Mycielski Balance Conjecture, (with J. Kieffer), *2007 Conference on Analysis of Algorithms*, Juan-les-Pins, France, *Proc. DMTCS*, 19-28, 2007.
124. On the Exit Time of a Random Walk with Positive Drift  $\sum A_i$  (with M. Drmota), *2007 Conference on Analysis of Algorithms*, Juan-les-Pins, France, *Proc. DMTCS*, 291-302, 2007.
125. Functional Annotation of Regulatory Pathways, (with J. Pandey, M. Koyuturk, S. Subramaniam, and A. Grama), *Proc. ISMB/ECCB*, Vienna, 2007, also *Bioinformatics*, 23(13), 377-386, 2007.
126. What is Information? (with J. Konorski), *Zeszyty Politechniki Gdanskiej*, 5, 171-177, 2007; also *Festschrift in Honor of Jorma Rissanen*, 154-172, 2008.
127. Annotating Pathways in Interaction Networks, (with J. Pandey, M. Koyuturk, and A. Grama), *Pac Symp Biocomput.*, 153-65, 2008.
128. Profile of Tries, (with G. Park, H-K. Hwang and P. Nicodeme) *Proc. LATIN'08*, LNCS 4957, 1-11, 2008.
129. On Some Non-Linear Recurrences That Arise in Computer Science, *Proc. Frontiers in Applied and Computational Mathematics*, 172-181, World Scientific, New Jersey, 2008.
130. Large Deviations for Constrained Pattern Matching, (with Y. Choi) *Proc. ISIT'08*, Toronto, 2141-2145, 2008.
131. Facets of Information in Communications, *Proc. 5-th Polish-German Teletraffic Symposium*, 5-14, Berlin, 2008.
132. Average Redundancy for Known Sources: Ubiquitous Trees in Source Coding, *Proc. Fifth Colloquium on Mathematics and Computer Science Algorithms, Trees, Combinatorics and Probabilities*, DMTCS proc., AI, 19-58, September 22-26, Blaubeuren, 2008,
133. (Un)Expected Behavior of Digital Search Tree Profile (with M. Drmota), *Proc. SODA 2009*, 130-138, New York, 2009.
134. Compression of Graphical Structures (with Y. Choi), *2009 International Symposium on Information Theory*, 364-368, Seoul, 2009.
135. Structural Complexity of Random Binary Trees (with J. Kieffer and E-H. Yang), *2009 International Symposium on Information Theory*, 635-639, Seoul, 2009.

136. Minimum Expected Length of Lossless Compression of Memoryless Sources (with S. Verdu), *2009 International Symposium on Information Theory*, Seoul, 369-373, 2009.
137. Deinterleaving Markov Processes via Penalized ML (with G. Seroussi and M. Weinberger), *2009 International Symposium on Information Theory*, Seoul, 1739-1743, 2009.
138. Minimax Redundancy for Large Alphabets (with M. Weinberger), *2010 International Symposium on Information Theory*, 1488-1492, Austin, Texas, 2010.
139. Counting Markov Types (with C. Knessl and P. Jacquet) *Proc. 21 International Conference on Analysis of Algorithms*, 389-402, Vienna, 2010.
140. A General Discrete Divide and Conquer Recurrence and Its Applications, (with M. Drmota), *Proc. SODA 2011*, San Francisco, 2011.
141. Analysis of a Block Arithmetic Coding: Discrete Divide and Conquer Recurrences, (with M. Drmota) *2011 International Symposium on Information Theory*, 1424-1428, St. Petersburg, 2011.
142. Limiting Distribution of Lempel Ziv'78 Redundancy, (with P. Jacquet) *2011 International Symposium on Information Theory*, 1609-1612, St. Petersburg, 2011.
143. Deinterleaving Markov Processes: the Finite-Memory Switch Case (with G. Seroussi and M. Weinberger) *2011 International Symposium on Information Theory*, 223-227, St. Petersburg, 2011.
144. Two-Phase Cardinality Estimation Protocols for Sensor Networks with Provable Precision, (with J. Cichon, J. Lemiesz, and M. Zawada), *2012 IEEE Wireless Communications and Networking Conference (WCNC 2012)*, Paris, April 2012.
145. On a Recurrence Arising in Graph Compression, (with Y. Choi and C. Knessl) *23rd International Meeting on Probabilistic, Combinatorial and Asymptotic Methods for the Analysis of Algorithms*, AofA'12, Montreal, 2012.
146. Joint String Complexity for Markov Sources, (with P. Jacquet) *23rd International Meeting on Probabilistic, Combinatorial and Asymptotic Methods for the Analysis of Algorithms*, AofA'12, Montreal, 2012.

**Other Conference Proceedings and Other Publications:**

1. Simulation of ALOHA-type systems, *Report of Kokusai Densin Denwa, Research and Dev. Labs.*, Tokyo, p. 32, 1975.
2. Simulation of telecommunication networks (with J. Konorski, R. Sobczak and M. Tomaszewski), *Works of I National Symposium of Students Scientific Association*, Wroclaw 1975, pp. 34-37. The paper received the first Prize Paper Award for the best paper.
3. Efficiency of flow control in computer networks versus quantity and quality of auxiliary information (with J. Konorski), *Proceedings of II National Symposium of Radio Science*, Gdansk, 1978, pp. 136-138 (in Polish).

4. A packet switching with multiple radio channels (with K. Pawlikowski), *International Conference on Systems Science*, Wroclaw 1978, Abstracts of paper, pp. 165–166.
5. An approximate analysis of a multiaccess system with random access and feedback (with M. Tomaszewski), *Proceedings of III National Symposium of Radio Science*, Wroclaw 1981, pp. 145–150 (in Polish).
6. Performance evaluation of a reservation protocol, *Collection Seminars INRIS*, 1983, pp. 57–74.
7. Bounds, inequalities and approximations in a buffered contention packet broadcast system, *Workshop on Queueing and Control Problems with Applications to Satellite and Other Communication Systems*, Abstract of papers, University of Maryland, 1984, pp. 13–14.
8. Stability and instability conditions for some multidimensional queueing models, *Fifth International Conference on Mathematical Modeling*, University of California, Abstract of papers, Berkeley, 1985.
9. Throughput analysis of conflict resolution algorithms and some asymptotic results, *Fifth International Conference on Mathematical Modeling*, Abstract of papers, University of California, Berkeley, 1985.
10. Queueing networks and multiqueues: An equivalence (with V. Rego), *Queueing networks and applications*, 1987, New Brunswick, Abstract pp. 53–54.
11. Multimodality analysis of uniformly bounded Markov chains, *Analysis and Control of Large Scale Stochastic Systems*, Abstracts, Chapel Hill 1988, pp. 65–66.
12. A unified approach to some combinatorial algorithms through order statistics, *SIAM Conference on Applied Probability in Science and Engineering*, New Orleans, 1990.
13. Some combinatorial techniques for digital random trees, *ORSA/TIMS Conference on Applied probability in the Engineering, Information and Natural Science*, Monterey, Abstract pp. 1-1, January 1991.
14. Stability of some distributed systems (with L. Georgiadis), *2nd ORSA Telecommunication Conference*, Boca Raton, 1992.
15. Stability analysis of queueing systems with monotonicity properties, *3rd ORSA Telecommunication Conference*, Boca Raton, 1995.
16. Analysis of Algorithms (AofA): Part I: 1993-1998 (“Dagstuhl Period”), *Bulletin of EATCS*, 77, 43-62, 2002.
17. Analysis of Algorithms (AofA): Part II: 1998 – 2000 (“Princeton–Barcelona–Gdansk”) (with M. Drmota), *Bulletin of the European Association of Theoretical Computer Science*, 80, 61-76, June 2003.

#### **RECENT SOFTWARE PROJECTS:**

(For details and demos see my homepage <http://www.cs.purdue.edu/homes/spa.>)

1. Pattern Matching Image Compression (with M. Atallah and Y. Genin); see publication [70] .
2. 2D Pattern Matching Image and Video Compression (with M. Alizna and A. Grama); see publication [75].
3. Indexing and Mapping of Proteins by Sammon's Projection Algorithm (with I. Apostol); see publication [69].
4. Audio Compression based on Pattern Matching (with A. Grama and R. Gwadera).
5. Streaming Video Using Mobile Code (with A. Grama). Patent disclosure December 2002.
6. Finding Reliable Threshold for Intrusion Detection.
7. Joint Source-Channel Lempel-Ziv'77: Truly resilient Lempel-Ziv'77 (with S. Lonardi). Patent disclosure February 2003.
8. MULE: Metabolic Pathway Mining Software (with M. Koyuturk and A. Grama).
9. MaWISH: Pairwise Alignment of Protein Interaction Networks (with M. Koyuturk and A. Grama).
10. SIDES: An Algorithm for Identifying Significantly Dense Subgraphs (with M. Koyuturk and A. Grama).

### **Patents and Disclosures**

1. A method of channel switching in a computer network (in Polish: "Sposob sterowania procesami komutacyjnymi w wezle sieci teleinformatycznej z komutacja kanalow zbudowanym na bazie systemu komputerowego"), with A. Badach, R. Sobczak and M. Zientalski. Patent PRL No. 126 509, 1982.
2. "Real-Time Multimedia Decoder Using Mobile Code" (with A. Grama), disclosure No. P-02127 (patent application 60/462,253
3. "Error Resilient Lempel-Ziv Based Data Compression Schemes", (with S. Lonardi), disclosure No. P-03019.

## PROFESSIONAL RECOGNITION

### Awards, Honors, Fellowships

1969	Second level of Mathematical Olimpiad, Toruń, Poland.
1970	Second level of Mathematical Olimpiad, Toruń, Poland.
1973	First place in “Copernicus Competition” for the best student of the Electronics Department of Technical University of Gdansk
1974	First place in “Czerwona Róża” Competition for the best student of the Technical University of Gdansk
1975	Best Paper Award for the conference <i>Works of the I National Symp. of Students Scientific Association</i> , Wroclaw, Poland
1975	Competitive IASTE Fellowship in Kokusai Densin Denwa, Tokyo, Japan
1977-1980	Award of the President of the Technical University of Gdansk
1983	Alexander von Humboldt Fellowship (declined to accept an offer from the McGill University)
1997	A top finalist (from a set of three) for the Best Paper Award of the Information Theory Society.
1999 & 2002	Nomination for the Best Paper Award of the Information Theory Society.
2004	Fellow of the IEEE.
2006	Erskine Fellow, University of Canterbury, New Zealand.
2008	Saul Rosen Professorship in Computer Science, Purdue.
2009	Best Paper Award of the Faculty of Technical University of Vienna (paper [110]).
2010	Humboldt Research Award
2010	Leadership Award, Purdue University
2011	Seeds of Success, Purdue University
2012	Leadership Award and team Award, Purdue University

### Editorial Boards:

- Field Editor, *Discrete Mathematics and Theoretical Computer Science*, 1995-.
- Managing Editor (Analysis of Algorithms, *Discrete Mathematics and Theoretical Computer Science*, 2002-2005.
- Editor, *Theoretical Computer Science*, 1998- 2012.
- Editor, *Foundation and Trends in Communications and Information Theory*, 2003-.
- Editor, *Int. Journal of Bioinformatics Research and Applications* (IJBRA), 2004 -.
- Editor, *ACM Transactions on Algorithms*, 2004 -.
- Editor, *Combinatorics, Probability, Computing*, 2005 -.
- Editor, *IEEE Transactions on Information Theory*, 2005 -.
- Editor, *Electronics and Telecommunications Quarterly*, 2008 -.
- Editor, *Algorithmica*, 2009 -.
- Editor, *Advances in the Theory of Computation and Computational Mathematics* (Book series), 1998-.

- Guest Editor, *IEEE Transactions on Automatic Control*, 1990-1992.
- Guest Editor, *Theoretical Computer Science*, 1994-1995.
- Guest Editor, *Random Structures & Algorithms*, 1995-1997.
- Guest Editor, *Algorithmica*, 1997-1998.
- Guest Editor, *Algorithmica*, 1998-1999.
- Guest Editor, *Random Structures & Algorithms*, 2000-2002.
- Guest Editor, *Combinatorics, Probability, & Computing*, 2002-2003.
- Guest Editor, *IEEE Trans. Information Theory*, 2003-2004.
- Guest Editor, *Algorithmica*, 2004-2005.
- Guest Editor, *IEEE Trans. Information Theory*: Special Issue on Molecular Biology and Neuroscience, 2008-2009.

### Steering Committees

- Analysis of Algorithms, AofA (together with P. Flajolet, D. E. Knuth, and B. Sedgewick)
- Analytic Algorithmics and Combinatorics, ANALCO (together with Flajolet, and B. Sedgewick)

### Selected Program Committee Member:

- Member of Program Committee, *International Symposium PERFORMANCE'84*, Paris, 1984.
- Member of Program Committee, *PERFORMANCE'86 and ACM SIGMETRICS 1986, Joint Conference on Computer Performance Modeling, Measurement and Evaluation*, North Carolina State University, 1986.
- Member of Program Committee, *GLOBCOM 93*, Houston 1993.
- Organizer of Invited Sessions for several SIAM and ORSA Applied Probability conferences (1990, 1991, 1992, 1993, 1995), and Allerton Conference on Communication, Control and Computing (1995).
- Member of Organizing and Program Committee, *Fourth Int. Seminar on Average-Case Analysis of Algorithms*, Princeton 1998.
- Program Chair, *1999 Information Theory and Networking Workshop*, June 27–July 1, 1999, Metsovo Greece.
- Member of Organizing and Program Committee, *Fifth Seminar on the Analysis of Algorithms*, Barcelona 1999.

- Member of Program Committee, *19th IEEE International Performance, Computing, and Communications Conference (IPCCC 2000)*, Phoenix, Arizona, February 20-22, 2000.
- Conference Chair, *Sixth Seminar on the Analysis of Algorithms*, Krynica Morska, Poland, 2000.
- Member of Program Committee, *2000 IEEE International Symposium on Information Theory*, Sorrento, Italy, June 25–30, 2000.
- Member of Program Committee, *2-nd International Symposium on Advanced Concepts for Intelligent Vision Systems (ACIVS'00)*, Baden-Baden, July 31 – August 4, 2000.
- Member of Program Committee, *Seventh Seminar on the Analysis of Algorithms*, Tatihou, France, July 2–8, 2001.
- Member of Program Committee, *3-nd International Symposium on Advanced Concepts for Intelligent Vision Systems (ACIVS'01)*, Baden-Baden, July 30 – August 3, 2001.
- Member of Program Committee, *The 21st International Performance, Computing and Communications Conference*, Phoenix, Arizona, April 3-5, 2002.
- Member of Program Committee, *Eighth Seminar on the Analysis of Algorithms*, Strobl, Austria, June 23-28, 2002.
- Member of Program Committee, *4-th International Symposium on Advanced Concepts for Intelligent Vision Systems (ACIVS'02)*, Ghent, Belgium, September 9-11, 2002.
- Member of Program Committee, *The Sixth International Conference on Software Computing and Distributed Processing*, Rzeszow, Poland, June 25-25, 2002.
- Member of Program Committee, *Ninth International Seminar on the Analysis of Algorithms*, San Miniato - Pisa (Italy), June 22-28, 2003.
- Invited session organizer and chair, *2003 Information Theory Workshop*, Hong Kong, July 6-10, 2003 (cancelled).
- Member of Program Committee, *5-th International Symposium on Advanced Concepts for Intelligent Vision Systems (ACIVS'03)*, Ghent, Belgium, September 2-5, 2003.
- Chair, NSF Workshop on *Information Theory and Computer Science Interface*, Chicago, October 2003.
- Member of Program and Organizing Committee, *1st Workshop on Analytic Algorithmics and Combinatorics (ANALCO 04)* January 10, 2004, New Orleans.
- Member of Program Committee, *HiCOMB, 3-rd International Workshop on High Performance Computational Biology*, Santa Fe, April, 2004.
- Member of Program Committee, *II Conference on Information Technology*, Gdansk, May 16-18, 2004.

- Chair, *Tenth International Seminar on the Analysis of Algorithms*, MSRI, Berkeley, June 14-18, 2004.
- Member of Program Committee, *6-th International Symposium on Advanced Concepts for Intelligent Vision Systems (ACIVS'04)*, Ghent, Belgium, August 2004.
- Member of Program Committee, *11th International Conference on String Processing and Information Retrieval (SPIRE)*, October 5-8, 2004, Padova, Italy.
- Member of Program Committee, *2004 IEEE Information Theory Workshop*, October 24-29 in San Antonio, Texas
- Member of Program Committee, *III Conference on Information Technology*, Gdansk, May 2005.
- Member of Program Committee, *2005 IEEE International Symposium on Information Theory*, Adelaide, Australia, September 4-9, 2005.
- Co-Chair, *Information Beyond Shannon*, Orlando, October 27-28, 2005.
- Member of Program Committee, *10th Panhellenic Conference on Informatics*, Volos, Greece, November 11-13, 2005.
- Program Committee Member, *Information Theory Workshop*, Punta del Este, Uruguay, March 14-17, 2006.
- Progra Committee Member, *IV Conference on Information Technology*, Gdansk, May 21-24, 2006.
- Member of Program Committee, *2006 IEEE International Symposium on Information Theory*, Seattle, July 9-14, 2006.
- Member of Program Committee, *European Conference on Computational Biology*, Eliat, Isreal, September 10-13, 2006.
- Member of Program Committee, *First International Multiconference on Computer Science and Information Systems*, Wisla, Poland, 6-10, November 2006.
- Member of Program Committee, *11TH PANHELLENIC CONFERENCE ON INFORMATICS*, Patras, Greece, May, 2007
- Member of Program Committee, *V Conference on Information Technology*, Gdansk, May 20-23, 2007.
- Member of Program Committee, *Seventh IEEE International Conference on Data Mining*, Oct 28-31, 2007, in Omaha, Nebraska
- Member of Program Committee, *5th International Workshop on Biological Data Management*, Regensburg (Germany), September 3-7 2007.
- Member of Program Committee, *International Multiconference on Computer Science and Information Technology*, (IMCSIT), October 15-17, 2007, Wisla, Poland.
- Co-Chair, *Analytic Algorithms and Combinatorics (ANALCO'08)*, Jan. 19, 2008.

- Member of Program Committee, *2008 IEEE Information Theory Workshop*, May 5-9, 2008, Porto, Portugal.
- Member of Program Committee, *Information Theory and Statistical Learning (ITSL)*, Las Vegas, June 23-24, 2008.
- Member of Program Committee, *2008 IEEE International Symposium on Information Theory*, Toronto, July 6-11, 2008.
- Member of Program Committee, *SIBIRCON-2008 International Conference on Computational Technologies in Electrical and Electronics Engineering*, Novosibirsk, July 21-25, 2008.
- Member of Program Committee, Fifth Colloquium on Mathematics and Computer Science, September 22-26, 2008, Blaubeuren, Germany.
- Member of Program Committee, *2009 IEEE International Symposium on Information Theory*, Seoul, South Korea, June 28 - July 3, 2009.
- Member of Program Committee, ACM-SIAM Symposium on Discrete Algorithms (SODA'10), Austin, Texas, Jan 17-19, 2010.
- Member of Program Committee, 9th Symposium on Latin American Theoretical Informatics, LATIN 2010, Oaxaca, Mexico, April, 2010.
- Member of Program Committee, 2nd International IEEE Conference on Information Technology ICIT'2010, Gdansk, Poland, June 28-30, 2010.
- Member of Program Committee, SIBIRCON , Irkutsk, Russia, July 11 -15, 2010.
- Member of Program Committee, 21-st Probabilistic, Combinatorial and Asymptotic Methods for the Analysis of Algorithms, Vienna, June 28-July 2, 2010.
- Chair, STC Kick-off Workshop on Science of Information, Chicago, September 6-7, 2010.
- Co-Chair, Mini-Workshop: Random Trees, Information and Algorithms , Oberwolfach, April 24-30, 2011.
- 2011 IEEE International Symposium on Information Theory, St. Petersburg, Russia, July 31 to August 5, 2011.
- 2011 IEEE International Conference on Data Mining, Vancouver, Canada, December 11-14, 2011.
- 10th Symposium on Latin American Theoretical Informatics, LATIN 2012, Universidad Catolica San Pablo, Arequipa, Peru, April 16-20, 2012.
- Member of Program Committee, *2013 IEEE International Symposium on Information Theory*, Istanbul, July 7-12, 2013.

**NSF Panels and Workshops:**

- Division of Networking and Communications.
- Computer-Communication Research.
- Formal and Mathematical Methods (FMM).

**Consulting:**

- Bell Communication Research, Morristown.
- ESPRIT III, LAURA Project (INRIA, France).
- Hewlett-Packard Laboratories, Palo Alto.
- ESPRIT, Project CATSERVER (INRIA, France)
- Jones International University.
- Kevin Kennedy & Associates Inc., Indianapolis.
- Gerson Lehrman Group.

**Membership of Professional Organizations**

- Institute of Electrical and Electronics Engineers (IEEE) (Fellow)
- Society for Industrial and Applied Mathematics (SIAM)
- The New York Academy of Sciences
- Mathematical Association of America
- Awards Committee of the IEEE Information Theory Society.

**Invited Talks:**

1983 University Paris VI, France

1983 INRIA, France

1983 University of Toronto, Canada

1983 McGill University, Canada

1984 *Workshop on Queueing and Control Problems with Applications to Satellite and Other Communication Systems*, University of Maryland

1984 Wayne University, Detroit

1984 Purdue University

1986 Rutgers University

1986 Bell Communication Research, Morristown

1986 AT&T Lab., Murray Hill

1986 *25-th IEEE Conference on Decision and Control*, Athens, Greece

1987 University of Virginia

1987 University of Maryland, College Park

1989 INRIA, Rocquencourt, France

1990 *SIAM Conference on Applied Probability in Science and Engineering*, New Orleans

1990 *Workshop on Computing and Molecular Biology*, (invited participant), National Research Council, Washington

1990 Technical University of Gdansk, Poland

1990 Technical University of Vienna, Austria

1991 *ORSA Conference on Applied Probability in the Engineering, Informational and Natural Sciences*, Monterey

1991 INRIA, Rocquencourt, France

1991 NEC Research Institute, Princeton

1991 IBM Research Center, Yorktown Heights

1991 *Seminar on Random Graphs and Probabilistic Methods in Combinatorics and Computer Science "Random Graphs'91"*, Poznań, Poland

1992 *EURO/TIMS Conference*, Helsinki, Finland

1992 *IMS Workshop "Direction in Probability": Random Trees*, Boston

1992 INRIA, Rocquencourt, France

1992 INRIA, Sophia Antipolis, France

1992 Adam Mickiewicz University, Poznań, Poland

1993 *Average-Case Analysis Algorithms Seminar*, Dagstuhl, Germany.

1993 *31-st Annual Allerton Conference on Communication, Control, and Computing*, Allerton Park, IL.

1994 Colorado University, Boulder.

1994 Technical University of Gdansk, Poland.

1994 *Summer Course in Computer Science*, University of Helsinki, Finland.

1995 INRIA, Rocquencourt, France

1995 Institute Gaspard Monge, University Paris VI, Paris, France.

1995 *Average-Case Analysis Algorithms Seminar*, Dagstuhl, Germany.

1995 Carnegie Mellon University, Pittsburgh

1995 *33-st Annual Allerton Conference on Communication, Control, and Computing*, Allerton Park, IL.

1995 INRIA, Rocquencourt, France.

1996 INRIA, Sophia Antipolis, France.

1996 *Information Theory Workshop*, Haifa, Israel.

1996 *International Conference on Image Processing*, Lausanne, Switzerland

1996 INRIA, Rocquencourt, France.

1997 *DIMACS Workshop on Probabilistic Analysis of Algorithms*, New Jerrey.

1997 Technical University of Gdansk, Gdansk, Poland.

1997 *Average-Case Analysis Algorithms Seminar*, Dagstuhl, Germany.

1997 University of California at Berkeley.

1997 Stanford University, Palo Alto.

1997 Hewlett-Packard Laboratories, Palo Alto, California.

1998 INRIA, Rocquencourt, France.

1998 Université Paris-Sud, Orsay, France

1998 *Average-Case Analysis Algorithms Seminar*, Princeton.

1998 DIMACS Workshop on Codes and Trees: Algorithmic and Information Theoretic Approaches, Rutgers University, NJ.

1999 Plenary Speaker (1/8) at the *Fifth Seminar on the Mathematical Analysis of Algorithms*, Barcelona, Spain.

1999 INRIA, Rocquencourt, France.

1999 University of California, Berkeley.

1999 Hewlett-Packard Laboratories, Palo Alto, California.

1999 IBM Almaden, San Jose, California.

1999 Stanford University, Palo Alto, California.

1999 University of California, Santa Cruz.

2000 INRIA, Rocquencourt, France.

2000 University of the Witwatersrand, Johannesburg, South Africa.

2000 *The Sixth Seminar on the Analysis of Algorithms*, Gdansk, Poland.

2000 Technical University of Gdansk, Gdansk, Poland.

2001 Florida State University, Tallahassee, FL.

2001 Ecole Polytechnique, France.

2001 University of Washington at St. Louis, St. Louis, MO.

2001 University of Michigan, Ann Arbor, MI.

2001 University of Marne-la-Vallee, Paris, France.

2001 Université de Versailles Saint Quentin-en-Yvelines, Versailles, France.

2001 INRIA, Rocquencourt, France.

2001 Ecole Normale Supérieure, Paris, France.

2001 Plenary Speaker (1/8) at the *Seventh Seminar on Analysis of Algorithms*, Tatiou, France.

2001 *Internet Process Coordination and Ubiquitous Computing*, Orlando, FL.

2002 *KnuthFest*, Stanford University, Palo Alto, California.

2002 Hewlett-Packard Laboratories, Palo Alto, California.

2002 Ecole polytechnique fédérale de Lausanne (EPFL), Lausanne, Switzerland.

2002 ULB Louvain Workshop, Brussels, Belgium.

2002 *MSRI Information Theory Workshop*, Berkeley, CA.

2002 Northwestern University, Evanston, IL.

2002 *Eighth Seminar on Analysis of Algorithms*, Strobl, Austria.

2002 50-lecie Wydziału Elektroniki, Telekomunikacji, i Informatyki, (50th-anniversary of the Department of Electronics at the Technical University of Gdańsk), Gdańsk, Poland.

2002 University of Zurich, Zurich, Switzerland.

2002 *SIAM Conference on Discrete Mathematics*, San Diego, CA.

2002 University of California at San Diego, San Diego, CA.

2003 *NSF/NIH Math-Biology Workshop*, Washington DC.

2003 *Second Workshop on Random Graphs and Randomized Algorithms*, Bertinoro, Italy.

2003 *Ninth Seminar on Analysis of Algorithms*, San Miniato, Italy.

2003 University of California at Santa Barbara, CA.

2003 Hewlett-Packard Laboratories, Palo Alto, California.

2003 IBM Almaden, San Jose, California.

2003 Stanford University, Palo Alto, California.

2003 Université de Bourgogne, Dijon, France.

2004 California Institute of Technology, Pasadena, CA.

2004 University of California, Riverside, CA.

2004 Keynote Speaker (1/2) at the *Second Conference on Information Technology*, Gdansk, Poland.

2004 Invited Lecturer of the Analysis of Algorithms Summer Graduate Program) , MSRI, Berkeley, June 2-11, 2004.

2004 *Tenth International Seminar on the Analysis of Algorithms*, MSRI, Berkeley, 2004

2004 *42-d Annual Allerton Conference on Communication, Control, and Computing*, Allerton Park, IL.

2005 Plenary Speaker (1/1) in the *2005 Analytic Algorithmics and Combinatorics (ANALCO05)*, Vancouver, January 22, 2005.

2005 Invited Speaker at *2005 Information Theory Workshop*, Rotorua, New Zealand, 2005.

2005 Invited speaker (1/4) at *Ottawa-Carleton Day in Discrete Math Day*, Ottawa, Canada.

2005 McGill University, Montreal.

2005 I2lab Distinguished Seminar Series, University of Central Florida, Orlando,

2005 Invited speaker (1/8), *10th Panhellenic Conference on Informatics*, Volos, Greece.

2006 Invited Speaker, Information Theory and Application Workshop, San Diego.

2006 *Science Prestige Lecture*, University of Canterbury, Christchurch, New Zealand.

2006 Hong Kong University of Science and Technology, Hong Kong.

2006 Jagiellonian University, Krakow, Poland.

2006 MIT, Boston.

2006 University of Pennsylvania, Philadelphia.

2006 Northwestern University, Evanston, IL.

2006 University of California, Riverside, CA.

2006 University of Illinois at Urbana, IL.

2007 Invited Speaker, *Information Theory and Application Workshop*, San Diego, CA.

2007 Princeton University, NJ.

2007 Special Colloquium (1/3), Technical University of Vienna, Vienna, Austria.

2007 Poznan University of technology, Poznan, Poland.

- 2007 Keynote Speaker (1/4) at *2007 Conference on Analysis of Algorithms*, Juan des Pins, France.
- 2007 The Istituto di Analisi dei Sistemi ed Informatica "A. Ruberti", Rome, Italy (sponsored by Italian Academy of Science).
- 2007 University of California, San Diego.
- 2007 Smith Distinguished Lecture at University of California, Irvine.
- 2007 Keynote Speaker (1/8), *Facets of Entropy*, Copenhagen, Denmark.
- 2008 Plenary speaker (1/5), *8th Latin American Theoretical Informatics Symposium (LATIN'08)*, Rio, Brasil.
- 2008 Invited Speaker, *Information Theory Workshop*, Porto, Portugal.
- 2008 Keynote speaker (1/2), *Information Theory and Statistical Learning (ITSL)*, Las Vegas, 2008.
- 2008 Plenary Speaker (1/5), *Fifth Colloquium on Mathematics and Computer Science*, Blaubeuren, Germany.
- 2008 Invited Speaker (1/2), *Polish-German Teletraffic Symposium*, Berlin, 2008
- 2008 Technical University of Berlin.
- 2008 *Colloquium for Philippe Flajolet's 60th Birthday*, Paris.
- 2009 Invited Speaker, *Information Theory and Application Workshop*, San Diego.
- 2009 Invited Speaker, *Israel Stringology Workshop*, Israel, 2009.
- 2009 Invited Speaker, *Genomic Error Correction*, Paris, 2009.
- 2009 Technical University of Catalonia, Barcelona, Spain.
- 2010 Invited Speaker, *Information Theory and Application Workshop*, San Diego.
- 2010 Invited Speaker, Amgen Inc., Thousand Oaks, CA.
- 2010 Invited Speaker, Technical University of Munich, Munich, Germany.
- 2010 University of Frankfurt, Germany.
- 2010 University of Stuttgart, Germany.
- 2010 Invited Speaker (1/2), Workshop in honor of Prof. Sobczak retirement, Technology University of Gdansk, Gdansk, Poland.
- 2010 Visiting Fellow, Isaac Newton Institute for Mathematical Sciences Institute, Cambridge, UK.
- 2010 Kings' College, London, UK.
- 2010 Invited Tutorial Speaker (1/4), *21st Int. Meeting on Probabilistic, Combinatorial and Asymptotic Methods for the Analysis of Algorithms*, Vienna, June 28-July 2, 2010.

- 2010 Oracle, Redwood Shores, CA.
- 2010 MIT Theory of Computing Colloquium, Boston, MA.
- 2011 Invited Speaker, 30th Anniversary of Department of Computer Science & Engineering, University of Southern Florida, Tampa.
- 2011 Invited Speaker, University Paris 13, Paris, France.
- 2011 Invited Speaker, *Alignment-free Sequence Comparison*, Venice 2011.
- 2011 Invited Speaker, Oberwolfach, Germany
- 2011 Templeton Foundation Mini-Workshop, Edinburgh, Scotland.
- 2011 Plenary Speaker (1/4) *International Symposium on Information Theory*, St. Petersburg, Russia, 2011.
- 2011 Distinguished Colloquia Speaker, Concordia, Montreal, Canada
- 2012 Plenary Speaker (1/7), *Polish Combinatorial Conference*, Bedlewo, Poland.
- 2012 Invited Speaker, Conference on Information Sciences and Systems, Princeton.

### Research Contracts and Grants Received

1986	\$3,900	Purdue Research Foundation XL Grant
1987-1989	\$103,973	National Science Foundation, Grant NCR-8702115 “Stability Problems in Communication Networks” (with D. Marinescu and V. Rego).
1989-1990	B.F.216,000	North Atlantic Treaty Organization, Collaborative Grant 0057/89 “Design and Analysis of Stable and Optimal Data Structures” (with P. Jacquet, INRIA, France).
1989-1992	\$219,973	National Science Foundation, Grant CCR-8900305 “Algorithmic and Combinatorial Problems on Words” (with A. Apostolico).
1989-1992	\$361,600	National Institute of Health, Grant R01 LM05118 “Algorithms for Macromolecular Structure Analysis” (with A. Apostolico, M. Atallah, P. Gilham and H.L. Weith).

1990-1992	\$9,332	National Science Foundation, Grant INT-8912631 "Analysis of Data Structures for Digital Search" (with P. Kirschenhofer and H. Prodinger, Technical University of Vienna, Austria).
1990-1993	\$265,217	Air Force Office of Scientific Research, Grant AFOSR-90-0107 "Efficient Algorithmic Techniques for Combinatorial Problems" (with A. Apostolico and A. Atallah).
1990-1991	B.F.147,000	North Atlantic Treaty Organization, Collaborative Grant 0057/89/Renewal "Design and Analysis of Stable and Optimal Data Structures (Renewal)" (with P. Jacquet, INRIA, France).
1992-1993	\$13,326	Amendment to NSF Grant CCR-8900305 (REU Supplement, and Supplement for US Participants/1991 Summer School of the Fibonacci Institute).
1991-1993	B.F.187,000	North Atlantic Treaty Organization, Collaborative Grant 0057/89/Renewal "Design and Analysis of Stable and Optimal Data Structures (Second Renewal)" (with P. Jacquet, INRIA, France)
1992-1995	\$253,946	National Science Foundation, Grant NCR-9206315, "Stability Considerations for Networks".
1992-1994	\$286,266	National Science Foundation, Grant CCR-9201078, "Algorithmic and Combinatorial Tools for Sequence Analysis" (with A. Apostolico).
1995-1997	B.F.180,000	North Atlantic Treaty Organization, Collaborative Grant CRG.950060 "Data Compression Based on (Approximate) Pattern Matching", (with P. Jacquet and M. Regnier, INRIA, France).
1995-2000	\$284,000	National Science Foundation, Grant NCR-9415491, "Data Compression from the String Matching Perspective: Second Order Properties".
1997-1999	B.F.210,000	North Atlantic Treaty Organization, Collaborative Grant CRG.950060/Renewal "Data Compression Based on (Approximate) Pattern Matching", (with P. Jacquet and M. Regnier, INRIA, France).
1998-1999	\$12,635	Purdue Research Foundation – SIRG 690/1398-2842-SIRG "Multimedia Data Compression Based on Approximate Pattern Matching" (with A. Grama and K. Park).

1998-2001	\$295,000	National Science Foundation, Grant NCR-9804760, "Towards Analytic Information Theory: Data Compression, Predication and Universal Coding Through Analytic Methods"
1999-2000	\$10,000	Purdue Global Initiative Faculty Grant "Towards Analytic Information Theory" (with I. Kontoyiannis).
1999-2000	\$25,500	National Science Foundation, Grant CCR-9901835, "1999 IEEE Information Theory and Communication Workshop and 1999 Information Theory and Networking Workshop" (with Shu Lin, Hawaii University).
1999-2004	\$2,200,000	, National Science Foundation, Grant EIA-9972883, "MSI: A Research Infrastructure for Integrated Quality of Service Management in Multimedia Computing Environments", as an associate researcher.
2000-2002	\$50,000	Sponsors of CERIAS at Purdue University, Grant No. 1419991431A, "Finding Reliable Threshold for Intrusion Detection".
2001-2003	HK\$387,248	Hong Kong Earmarked Research Grant No. PolyU 5146/01E, "Towards a General Approach to Pre-queue Stability Problems with Applications in Wireless Communications", (with R. K. C. Chang, HKPolyU).
2002-2005	\$215,000	National Science Foundation, CCR-0208709, "Analytic Information Theory, Combinatorics, and Algorithmics: The Precise Redundancy and Related Problems".
2002-2004	\$80,000	National Security Agency, "Exact and Asymptotic Solutions to Probabilistic Problems on Sequences" (with C. Knessl as a co-PI-consultant).
2002-2003	\$10,000	Sponsors of CERIAS at Purdue University, "Algorithms and Software for Accurate and Complete Intrusion Detection Systems" (with A. Grama).
2003-2004	\$40,000	National Science Foundation, CCR-0321451, "Information Theory and Computer Science Interface".
2003-2007	\$1,087,500	National Institute of Health, R01 GM068959-01, "Algebraic, Combinatorial, and Probabilistic Methods for Biological Sequences" (with A. Grama and S. Subramaniam).
2004-2005	\$10,000	National Security Agency, "Tenth Seminar on Analysis of Algorithms" (with G. Seroussi).

2004-2006	\$32,000	Air Force Office of Scientific Research, Grant FA8655-04-1-3074 "User Misbehaviour in Distributed Computer Systems and Networks" (with J. Konorski and J. Wozniak; as a consultant).
2005-2008	\$241,000	National Science Foundation, CCF-0513636, "Crossroads of Information Theory and Computer Science: Analytic Algorithmics, Combinatorics, and Information Theory".
2005-2008	\$125,000	National Science Foundation, DMS-0503742, "Collaborative Research: Nonlinear Equations Arising in Information Theory and Computer Sciences".
2007-2008	\$15,000	Purdue Research Foundation, "Information Transfer in Wireless Systems".
2007-2009	\$140,000	National Security Agency, "Asymptotic Solutions to Some Functional Equations Arising in Computer Science" (with C. Knessl).
2008-2012	\$500,000	National Science Foundation, DMS-0800568, "Information Flow in Biological Systems" (with A. Grama and D. Kihara).
2008-2011	€210000	EU Project No. 224218, "Optimization driven Multi-hop Network Design and Experimentation", Collaborative Grant"
2008-2011	\$300,000	National Science Foundation, CCF -0830140, "Collaborative Research: Information Theory of Data Structures".
2010-2011	zł 400000	MNSW 1967/B/T02/2009/37, "Teoriainformacyjna analiza struktur semantycznych stosowanych w rekomendacji kolaboratywnej", Collaborative Grant.
2010-2015	\$25,000,000	National Science Foundation, PI, No. 0939370, Science and Technology Center "Emerging Frontiers of Science of Information" (co-PI's A. Goldsmith, M. Sudan, S. Verdu and Bin Yu).
2010-2012	\$100,000	National Security Agency, "Asymptotic Solutions to Recurrences and Functional Equations Arising in Computer Science"

## TEACHING

*At Purdue University*

- CS 182 Foundation of Computer Science
- CS 251 Data Structures
- CS 381 Introduction to the Analysis of Algorithms
- CS 402 Computer Architecture
- CS 430 Data Structures

CS 481 Introduction to the Analysis of Algorithms  
CS 520 Computational Methods in Analysis  
CS 543 Discrete System Simulation  
CS 544 Simulation and Modeling of Computer Systems  
CS 590S Analysis of Algorithms on Sequences  
CS 590R Randomized and Probabilistic Algorithms  
CS 590A Probabilistic Methods in Computer Science  
CS 690 Introduction to Applied Combinatorics

*At McGill University*

CS 203 Data Structures  
CS615A Computer Methods in System Analysis I  
CS615B Computer Methods in System Analysis II

*At Technical University of Gdansk:*

Computer Networks  
Principles of Modern Communication  
Performance Evaluation

### **Ph.D. and M.S. Students**

**Bonita Rais** “Analysis of Some Trie Parameters Under Probabilistic Models” May 1992 (Assistant Professor at Ball State University, Muncie, IN; currently at Saint Norbert College, De Pere, WI).

**Jing Tang**, “Probabilistic Analysis of Digital Search Trees”, (Department of Mathematics), February 1996 (currently self-employed).

**Wen Hui Ren**, M.S. “An Optimal DNA Segmentation Based on the MDL Principle”, 2004.

**Mark Ward**, (Dept. Mathematics), “Analysis of an Error Resilient Lempel-Ziv Algorithm via Suffix Trees”, March 30, 2005 (University of Pennsylvania; currently at Purdue, Dept. Statistics.).

**Robert Gwadera**, “Reliable Identification of Significant Episodes in Event Sequences”, May 23, 2005 (IBM Zurich, Switzerland).

**Gahyun Park**, “Profile of Tries”, January 2006 (University of Wisconsin, Whitewater, WI; currently at State University of New York, Geneseo).

**Mehmet Koyuturk**, (co-advisor), “Comparative analysis of molecular interaction networks”, August 2006 (Case Western Reserve University, Cleveland, OH).

**Y-W. Choi**, “Structural Information in Strings and Graphs”, May 2010 (J. Craig Venter Institute, MA).

Abram Magner, expected 2014.

### **Graduate Seminar.**

1. In 2002 I initiated a graduate seminar called “Curious Minds” with about 10-15 graduate students (cf. <http://www.cs.purdue.edu/homes/spa/cm-schedule.html>).

2. In 2006 I started a new *Prestige Lecture Series on Science of Information* (cf. <http://www.cs.purdue.edu/homes/spa/info.html>).

### Recent Ph.D. Defense

At Purdue, I have been participating every year in several Ph.D defenses (not listed here). Outside Purdue, I have recently been on the following Ph.D. defenses:

1. Julien Clement, "Arbres Digitaux et Sources Dynamiques", September 2000, Université de Caen, France (*Rapporteur de thèse*).
2. Cedric Adjih, "Multimédia et accès à l'Internet haut débit: la filière du câble", June 2001, Université de Versailles Saint Quentin-en-Yvelines, France (*Président du jury*).
3. Jérémie Bourdon, "Analyse dynamique d'algorithmes: Exemples en arithmétique et en théorie de l'information", December 2002, Université de Caen, France (*Rapporteur de thèse*).
4. Costas Christophi, "The oscillatory distribution of distances in random tries", George Washington University, Washington, 2004.
5. Julien Fayolle, "Compression de données sans perte et combinatoire analytique", Université de Versailles, INRIA, France, 2006.
6. Georgios Rodolakis, "Analytical Models and Performance Evaluation in Massive Mobile Ad Hoc Networks", Ecole Polytechnique, 2006.

### Some Recent Undergraduate Students (working at least 3 months with me):

Yann Génin (1994,1995), Ecole Polytechnique, France (*Data Compression*)  
Yannick Lallement (1995), Nancy University, France (*Parallel Computing*)  
Denis Arnaud (1996), Ecole Polytechnique, France (*Predictive Image Compression*)  
Marc Alzina (1998), Ecole Polytechnique, France (*2D Video Compression*)  
David Meyer (2000), Purdue University (*Streaming Video Using Mobile Code*)  
Sacha Zyto (2000), Ecole Polytechnique, France (*Image Compression using SDD*)  
Christophe Levesque (2001), Ecole Polytechnique, France (*Video Compression*)  
Darren Zollman (2001), Purdue University (*Streaming Video Decompression*)  
Kalid Hilal (2001), Purdue University (*Intrusion Detection*)  
Heechang Yang (2001), Purdue University (*Computational Information Theory*)  
Sumi Kamara (2001), Purdue University (*Quantum Information Theory*)  
Suk Jin Sohn (2002), Purdue University (*Compression of Microarrays*)  
Quang Thai (2002), Ecole Polytechnique, France (*Extreme Video Compression*)  
J. Lee (2002), Purdue University (*Retrieving Noisy Data*)

**List of Collaborators:** David Aldous (Berkeley), Cedric Adjih (INRIA, France), Marc Alzina (Ecole Polytechnique, France), Izydor Apostol (Amgen Inc.), Alberto Apostolico (Purdue), Mikhail Atallah (Purdue), Luc Devroye (McGill, Montreal), Michael Drmota

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## SERVICE

### Department

1986-1987	Coordinator for CS 690S course
1988-1992	Graduate Committee
1993-1994	Graduate Committee
1995-1997	Chair of the Personnel Committee
1995-1996	Head Search Committee (elected)
2000-2001	Coordinator for CS 690S course
2001-2002	Member of the Personnel Committee
2001-2002	Head Search Committee (elected)
2004-2005	CS Bioinformatics Search Committee (chair)
2005-2007	CS Bioinformatics Search Committee
2006-2007	<i>Prestige Lecture Series on Science of Information</i> (founder and chair)
2006-2007	Chair of the Head Search Committee (elected)
2007-2009	Executive Committee (elected).
2009-2010	Strategic Planning Committee.
2010-2012	Personnel Committee.

### University

1991-1992	Student Cases
2000-2001	Mathematics Undergraduate Committee
2003-2005	Patent and Copyright Committee (recommended by the President)
2011-2012	CISSET Task Force

Elected to:

1994-1997	Purdue Senate
1995-1997	University Senate Nominating Committee
1999-2001	School of Science Grievance Hearing Committee
2002-2004	School of Science Faculty Council