

# Daniel KROB

*Date & Place of Birth:* August 26, 1961 – Colmar (France)

*Citizenship:* French

*Current Positions:*

- Chief Executive Officer – CESAMES, France

*Spoken Languages:* English, French & German

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## 1. Domains of Expertise

- Complex Product Development
  - Model Based Engineering & Safety
  - Systems Engineering & Architecting
  - Transformation of Industrial Organizations
- Business & Industrial Domains
  - Energy & High-Tech Industry
  - Aircraft, Automotive & Railway
  - Telecommunications
- Scientific Specialties
  - Algorithms
  - Combinatorics
  - Systemics
- Technological Areas
  - Digital Technology & Information Systems
  - Mobile Communications
  - Product Lifecycle Management

## 2. Professional Career

### 2.1 Professional Positions

- **1981-1986:** Student-Professor in Mathematics, Ecole Normale Supérieure, Paris
- **1984-1985:** Professor in Mathematics, Military High School, Le Mans
- **1986-1989:** Assistant Professor in Computer Science, INSA Rouen & University of Rouen
- **1989-1998:** Senior Researcher in Computer Science, National Centre for Scientific Research (CNRS)
- **1996-1997 & 2000-2009:** Associate Professor in Computer Science, Ecole Polytechnique
- **1998-:** Research Director in Computer Science, National Centre for Scientific Research (CNRS)
- **2009-2019:** Institute Professor in Computer Science, Ecole Polytechnique
- **2013-:** Chief Executive Officer, CESAMES

### 2.2 Professional Responsibilities

- **1995-1997:** Director, AMI (Algorithms, Models, Infographics) National Research Group, CNRS
- **1997-2002:** Director, LIAFA<sup>1</sup> Research Laboratory, CNRS & University Paris 7
- **2003-2015:** Head of the Industrial Chair “Engineering of Complex Systems”, Ecole Polytechnique<sup>2</sup>
- **2005-2015:** Director of the Master Program “Design & Management of Complex Software Systems”, Ecole Polytechnique
- **2015-2016:** Scientific director, SystemX Institute of Technology
- **2013-:** President, CESAMES Group

<sup>1</sup> Laboratory in Algorithmic Informatics: Fundamentals & Applications (LIAFA).

<sup>2</sup> This industrial chair was sponsored by Dassault Aviation, DCNS, DGA (Ministry of Defense) and Thales.

### **3. Diplomas & Titles**

#### **3.1 – Diplomas**

- Master degree in Pure Mathematics, University Paris 6, June 1984
- Master degree in Theoretical Computer Science, University Paris 7, June 1986
- PhD in Theoretical Computer Science, University Paris 7, March 1988
- Habilitation Thesis, University Paris 7, November 1991

#### **3.2 – Titles**

- Agrégé in Mathematics, July 1983
- Former student in Mathematics of Ecole Normale Supérieure, 1981-1986
- Best paper in Theoretical Computer Science, AFCET, 1993
- INCOSE Fellow<sup>3</sup>, July 2014

### **4. Main Academic & Professional Achievements**

#### **4.1 – Main Academic Achievements**

- Author of around 100 scientific papers (journals, conferences, etc.), 5 books and 3 patents with seminal results in various domains: algebraic & enumerative combinatorics, combinatorial optimization, computer security, mobile communication, signal processing, systems architecture, modelling & engineering including safety, theoretical computer science
- Editor of 18 national and international conference proceedings
- President of the permanent organizing committees of 3 major scientific & professional international conferences in combinatorics, computer science and systems engineering
- Former president of the evaluation committees of the “Information management & modelling” department of the French Aerospace Laboratory (ONERA, 2008-2013) and two divisions of the “Systems of systems” department of the French Ministry of Defense (2005-2011)

#### **4.2 – Main Professional Achievements**

- Creation of the systems architecture company “CESAMES” as a spin-off of Ecole Polytechnique
- Design & animation of short awareness & introductory and long on-the-job trainings in systems & enterprise architecture including safety & security aspects for several international companies: Alstom Transport, Areva, Airbus Helicopters, BMW, Huawei, Kawasaki Heavy Industries, Mitsubishi, Nissan, PSA, Renault, Safran, Sony, Schneider Electric, Société Générale, etc. <sup>4</sup>
- Direction of several coaching & assistance missions in systems & enterprise architecture including safety & security dimensions in most of the cases: Airbus, Audi, COMAC, Dassault Systèmes, Huawei, Nissan, PSA, Renault, Société Générale, Thales, Valeo, Vinci, Yazaki, etc.
- Direction of several major development organization transformation missions: Airbus, Areva, Bouygues Construction, Morpho, PSA, Renault, Safran Aircraft Engines, Zodiac Seats, etc.

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<sup>3</sup> Up to now, only 80 people in the world were recognized as fellows of the International Council in Systems Engineering (INCOSE). Daniel Krob is the only French INCOSE Fellow.

<sup>4</sup> Around 4,500 engineers around the world were trained through these trainings.

# Appendices

## A.1 – Publications

### A.1.1 – Journal Papers

1. *Centralisateurs d'opérateurs pseudo-différentiels formels à coefficients constants*, Communications in Algebra, 15 (11), 2263-2302, 1987
2. *Codes limités & factorisations finies du monoïde libre*, Informatique Théorique & Applications, 21 (4), 437-467, 1987
3. *Complete monoids & semi-rings*, Semigroup Forum, 36, 323-339, 1987
4. *Continuous monoids & semi-rings*, Semigroup Forum, 37, 59-78, 1988
5. *Factorisations dans le monoïde partiellement commutatif libre*, (with G. Duchamp), Comptes Rendus de l'Académie des Sciences de Paris, Série I, 312 (1), 189-192, 1991
6. *Some examples of formal series used in non-commutative algebra*, Theoretical Computer Science, 79 (1), 111-135, 1991
7. *Complete systems of B-rational identities*, Theoretical Computer Science, 89 (2), 207-343, 1991
8. *Matrix versions of aperiodic K-rational identities*, Informatique Théorique & Applications, 25 (5), 423-444, 1991
9. *On the partially commutative shuffle product*, (with G. Duchamp), Theoretical Computer Science, 96, 405-410, 1992
10. *Differentiation of K-rational expressions*, International Journal of Algebra and Computation, 2, (1), 57-87, 1992
11. *The free partially commutative Lie algebra: bases and ranks*, (with G. Duchamp), Advances in Mathematics, 95, (1), 92-126, 1992
12. *The lower central series of the free partially commutative group*, (with G. Duchamp), Semigroup Forum, 45, 385-394, 1992
13. *Models of a K-rational identity system*, Journal of Computer and System Sciences, 45, (3), 396-434, 1992
14. *Partially commutative Magnus transformations*, (with G. Duchamp), International Journal of Algebra and Computation, 3, (1), 15-41, 1993
15. *Free partially commutative structures*, (with G. Duchamp), Journal of Algebra, 156, (2), 318-361, 1993
16. *Quelques remarques sur les super-algèbres de Lie libres*, (with J. Désarménien, G. Duchamp & G. Mélançon), Comptes Rendus de l'Académie des Sciences de Paris, Série I, 318, 419-424, 1994
17. *Some consequences of a Fatou property of the tropical semiring*, Journal of pure and applied algebra, 93, 231-249, 1994

18. *Déformations de projecteurs de Lie*, (with G. Duchamp, B. Leclerc & J.Y. Thibon), Comptes rendus de l'Académie des Sciences de Paris, Série I, 319, 909-914, 1994
19. *The equality problem for rational series with multiplicities in the tropical semiring is undecidable*, International Journal of Algebra and Computation, 4, (3), 405-425, 1994
20. *A complete system of identities for one-letter rational expressions with multiplicities in the tropical semiring*, (with A. Bonnier-Rigny), [in ``Selected papers of the second international colloquium on words, languages and combinatorics'', Kyoto, August 1992, (M. Ito, Ed.)], Theoretical Computer Science, 134, 27-50, 1994
21. *GAET, un logiciel de génération automatique d'emploi du temps : recuit simulé & langage objet*, (with P. Andary & J. Pécuchet), Revue des systèmes de décision, 3, (3), 221-241, 1994
22. *Noncommutative symmetric functions*, (with I.M. Gelfand, A. Lascoux, B. Leclerc, V.S. Retakh & J.Y. Thibon), Advances in Mathematics, 112, 218-348, 1995
23. *Minor identities for quasi-determinants and quantum determinants*, (with B. Leclerc), Communications in Mathematical Physics, 169, (1), 1-23, 1995
24. *Conjectures on the enumeration of tableaux of bounded height*, (with F. Bergeron & L. Favreau), Discrete Mathematics, 139, 463-468, 1995
25. *Euler-Poincaré characteristic and polynomial representations of Iwahori-Hecke algebras*, (with G. Duchamp, A. Lascoux, B. Leclerc, T. Scharf & J.Y. Thibon), Publications of the Research Institute for Mathematical Sciences, Kyoto University, 31, (2), 179-201, 1995
26. *Fonctions quasi-symétriques, fonctions symétriques non commutatives & algèbres de Hecke à  $q=0$* , (with G. Duchamp, B. Leclerc & J.Y. Thibon), Comptes Rendus de l'Académie des Sciences de Paris, Série I, 322, 107-112, 1996
27. *Acyclic complexes related with noncommutative symmetric functions*, (with F. Bergeron), Journal of Algebraic Combinatorics, 6, 103-117, 1997
28. *Noncommutative symmetric functions II: Transformations of alphabets*, (with B. Leclerc & J.Y. Thibon), International Journal of Algebra and Computation, 7, (2), 181-264, 1997
29. *Algebraic combinatorics with Maple and ACE*, (with A. Lascoux, B. Leclerc, J.Y. Thibon, B.C.V. Ung & S. Veigneau), Maple Tech, 4, (1), 43-50, 1997
30. *Noncommutative symmetric functions IV: Quantum linear groups and Hecke algebras at  $q = 0$* , (with J.Y. Thibon), Journal of Algebraic Combinatorics, 6, (4), 339-376, 1997
31. *Noncommutative symmetric functions III: Deformations of Cauchy and convolution structures*, (with G. Duchamp, A.A. Klyachko & J.Y. Thibon), [in ``Special Issue : Lie Computations'', G. Jacob, V. Koseleff, Eds.], Discrete Mathematics and Theoretical Computer Science, 1, 159-216, 1997
32. *Recognizable subsets of the two letter plactic monoid*, (with A. Arnold & M. Kantha), Information Processing Letters, 64, 53-59, 1997
33. *Noncommutative symmetric functions V: A degenerate version of  $U_q(G/N)$* , (with J.Y. Thibon), [``Special issue for the memory of M. Schützenberger'', J.E. Pin Ed.], International Journal of Algebra and Computation, 9, 3/4, 405-430, 1999

34. *On extremal permutations avoiding  $\omega_N = N N-1 \dots 1$* , (with J.Y. Fourré & J.C. Novelli), *European Journal of Combinatorics*, 20, 773-787, 1999
35. *Noncommutative ribbons and quasi-differential operators*, (with R. Mantaci), *Annals of Combinatorics*, 4, 47-66, 2000
36. *Zassenhaus Lie idempotents,  $q$ -bracketing and a new  $q$ -exponential/logarithm correspondence*, (with G. Duchamp & E.A. Vassilieva), *Journal of Algebraic Combinatorics*, 12, 251-277, 2000
37. *The Chinese monoid*, (with J. Cassaigne, M. Espie, F. Hivert & J.C. Novelli), *International Journal of Algebra and Computation*, 11, (3), 301-334, 2001
38. *Some algorithms for synchronizing clocks of base transceiver stations in a cellular network*, (with J.L. Dornstetter, M. Morvan & L. Viennot), [in "Special issue on Mobile Computing and Wireless Networks", S. Olariu, Ed.], *Journal of Parallel and Distributed Algorithms*, 61, 855-867, 2001
39. *An overview of  $\Lambda$ -type operations on quasi-symmetric functions*, (with K. Bertet, M. Morvan, J.C. Novelli, H.D. Phan & J.Y. Thibon), [in "Special issue dedicated to the memory of A.I. Kostrikin"], *Communications in Algebra*, 29 (9), 4277-4303, 2001
40. *Performance analysis of modulation with diversity - A combinatorial approach I: Symmetric function theoretical methods*, (with J.L. Dornstetter, J.Y. Thibon & E.A. Vassilieva), *Discrete Mathematics and Theoretical Computer Science*, 5:1, 191-204, 2002
41. *Computing the average parallelism in trace monoids*, (with J. Mairesse & I. Michos), *Discrete Mathematics*, 273, 131-162, 2003
42. *Performance analysis of modulation with diversity - A combinatorial approach II: Bijective methods*, (with E.A. Vassilieva), *Discrete Applied Mathematics*, 145, (3), 403-421, 2005
43. *Modeling Commercial Processes and Customer Behaviors to Estimate the Diffusion Rate of New Products*, (with A. Bloch & A.F.S. Ng), *Journal of Systems Science and Systems Engineering*, 14, (4), 436-453, 2005
44. *Higher order peak algebras*, (with J.Y. Thibon), *Annals of Combinatorics*, 9, 411-430, 2005
45. *A combinatorial approach to evaluation of reliability of the receiver output for BPSK modulation with spatial diversity*, (with S. Bliudze), *Electronic Journal of Combinatorics*, 13, (1), article #R2, 31 pages, 2006
46. *Towards a Functional Formalism for Modelling Complex Industrial Systems*, (with S. Bliudze), [in "Special Issue: Complex Systems - European Conference - November 2005 - Selected Papers - Part 1"], *ComPlexUs*, 2, (3-4), 163-176, 2006
47. *Using Geometrical Properties for Fast Indexation of Gaussian Vector Quantizers*, (with J.M. Steyaert & E.A. Vassilieva), *EURASIP Journal on Applied Signal Processing*, Vol. 2007, Article ID 63192, 11 pages, doi:10.1155/2007/63192, 2007
48. *Complexité des systèmes d'information : une famille de mesures de la complexité scalaire d'un schéma d'architecture*, (with Y. Caseau & S. Peyronnet), *Software Engineering*, 82, 23-30, 2007
49. *Modelling of Complex Systems: Systems as data-flow machines*, (with S. Bliudze), [in "Special Issue: Machines, Computations and Universality"], *Fundamenta Informaticae*, 91, 1-24, 2009

50. *Fast paths in large-scale dynamic road networks*, (with G. Nannicini, P. Baptiste, G. Barbier & L. Liberti), Computational Optimization and Applications, 45, 143-158, 2010
51. *Modelling of Complex Systems II: A minimalist and unified semantics for heterogeneous integrated systems*, (with M. Aiguier & B. Golden), Applied Mathematics and Computation, 218, (16), 8039-8055, doi: 10.1016/j.amc.2012.01.048, 2012
52. *Technological architecture evolutions of Information Systems: trade-off and optimization*, (with V. Giakoumakis, L. Liberti & F. Roda), Concurrent Engineering: Research and Applications, 20, Issue 2, 127-147, 2012
53. *Un cadre méthodologique intégré pour l'architecture & l'optimisation de systèmes*, (with A. Dauron, A. Douffène & H. G. Chalé-Gongora), Software Engineering, 2017
54. *Handling the COVID-19 crisis: Toward an agile model-based systems approach*, (with De Weck O., Li L., Lui P.C., Rauzy A., Zhang X.G), Systems Engineering, Volume 23, Issue 5, 656-670, September 2020

### 55. A.1.2 – Conference Papers

1. *A complete system of B-rational identities*, [in "Automata, Languages and Programming", (M.S. Paterson, Ed.), 17th ICALP, Proceedings, July 1990], Lecture Notes in Computer Science, 443, 60-73, Springer Verlag, 1990
2. *Lazard's factorizations of free partially commutative monoids*, (with G. Duchamp), [in "Automata, Languages and Programming", (J. Leach Albert, B. Monien, M. Rodriguez Artalejo, Eds.), 18th ICALP, Proceedings, July 1991], Lecture Notes in Computer Science, 510, 242-253, Springer Verlag, 1991
3. *Stochastic automata and length distributions of rational languages*, (with G. Hansel & C. Michaux), [in "Mathematical Foundations of Computer Science", (A. Tarlecki, Ed.), 16th MFCS, Proceedings, September 1991], Lecture Notes in Computer Science, 520, 181-190, Springer Verlag, 1991
4. *Computing with B.W. in enveloping algebras*, (with G. Duchamp), [in "Algebraic Computing in Control", (G. Jacob, F. Lamnabhi-Lagarrigue, Eds.), 1st European Conference, Proceedings, March 1991], Lecture Notes in Control and Information Sciences, 165, 223-240, Springer Verlag, 1992
5. *The equality problem for rational series with multiplicities in the tropical semiring is undecidable*, [in "Automata, Languages and Programming", (W. Kuich, Ed.), 19th ICALP, Proceedings, July 1992], Lecture Notes in Computer Science, 623, 101-112, Springer Verlag, 1992
6. *Partially commutative Lyndon words*, (with P. Lalonde), [in "STACS 93", (P. Enjalbert, A. Finkel, K.W. Wagner, Eds.), 10th Symposium on Theoretical Aspects of Computer Science, Proceedings, February 1993], Lecture Notes in Computer Science, 665, 237-246, Springer Verlag, 1993
7. *Plactic-growth-like monoids*, (with G. Duchamp), [in "Proceedings of the international conference words, languages and combinatorics", (M. Ito, H. Jürgensen, Eds.), Kyoto, August 1992], 124-142, World Scientific, 1994
8. *Remarks on generalized Post correspondence problem*, (with T. Harju & J. Karhumäki), [in "STACS'96", (C. Puech, R. Reischuk, Eds.), 13th Symposium on Theoretical Aspects of Computer

- Science, Proceedings, February 1996], Lecture Notes in Computer Science, 1046, 39-48, Springer Verlag, 19
9. *The Chinese monoid*, (with J. Cassaigne, M. Espie, F. Hivert & J.C. Novelli), [in ``8th International Conference on Formal Power Series and Algebraic Combinatorics" (FPSAC'96), University of Minnesota, D. Stanton, Ed.], 69-80, 1996
  10. *A crystallisable version of  $U_q(Gl_N)$* , (with J.Y. Thibon), [in ``9th International Conference on Formal Power Series and Algebraic Combinatorics" (FPSAC'97), University of Vienna, C. Krattenthaler, Paule, Eds.], Volume 2, 326-338, 1997
  11. *Approximation of a direction of  $N^d$  in bounded coordinates*, (with F. Hivert, J.C. Novelli & G. Schaeffer), [in ``11th ACM-IEEE workshop on Discrete Algorithms and Methods for Mobile Computing and Communication" (DialM'97), Budapest, A. Ferreira, D. Krob, Eds.], (9), 8 pages, 1997
  12. *Some automata-theoretic aspects of Min-Max-Plus semirings*, [in ``Idempotency", J. Gunawardena, Ed.], Publications of the Newton Institute, 11, 70-79, Cambridge University Press, 1998
  13. *On extremal permutations avoiding  $\omega_N = N N-1 \dots 1$* , (with J.Y. Fourré & J.C. Novelli), [in ``Formal Power Series and Algebraic Combinatorics - 10th Conference" (FPSAC'98)], 275-285, Fields Institute, Toronto, 1998
  14. *Noncommutative ribbons and quasi-differential operators*, (with R. Mantaci), [in ``Formal Power Series and Algebraic Combinatorics - 11th Conference" (FPSAC'99), Barcelona, C. Martinez, M. Noy, O. Serra, Eds.], 275-286, Universitat Politecnica de Catalunya, 1999
  15. *Fast and stable computation of binary error rates in rapid Rayleigh Fading channels*, (with J.L. Dornstetter & J.Y. Thibon), [in ``ALGOTEL'2000", 2-ièmes rencontres francophones sur les aspects algorithmiques des télécommunications, E. Fleury, Ed.], 101-106, INRIA, 2000
  16. *Pseudo-permutations I: First combinatorial and lattice properties*, (with M. Latapy, J.C. Novelli, H.D. Phan & C. Schwer), [in ``Formal Power Series and Algebraic Combinatorics - 13th Conference" (FPSAC'01), Tempe (USA), H. Barcelo, V. Welker, Eds.], Arizona State University, 285-292, 2001
  17. *Performance evaluation of demodulation methods: a combinatorial approach*, (with E.A. Vassilieva), [in ``Discrete Models - Combinatorics, Computation and Geometry" (DM-CCG'01), R. Cori, J. Mazoyer, M. Morvan, R. Mosri, Eds.], Discrete Mathematics and Theoretical Computer Science, Conference Edition, 203-214, 2001
  18. *Pseudo-permutations II: Geometry and representation theory*, (with F. Boulier, F. Hivert & J.C. Novelli), [in ``Discrete Models - Combinatorics, Computation and Geometry" (DM-CCG'01), R. Cori, J. Mazoyer, M. Morvan, R. Mosri, Eds.], Discrete Mathematics and Theoretical Computer Science, Conference Edition, 123-132, 2001
  19. *On the asymptotic average Cartier-Foata height of traces*, (with J. Mairesse & I. Michos), [in ``Euroconference on Combinatorics, Graph Theory and Applications" (COMB'01), Barcelona (Spain), September 2001, J. Neseřtil, M. Noy, O. Serra, Eds.], Electronic Notes in Discrete Mathematics, 10, 8 pages, 2001
  20. *Performance analysis of PSK protocols with diversity*, (with E.A. Vassilieva), [in ``Services liés à la mobilité & réseaux mobiles de troisième génération" (MS3G'01), C. Gagnon, A. Girard, G. Pujolle, S. Ubéda, Eds.], 53-58, INRIA, 2001

21. *On the average height in trace monoids*, (with J. Mairesse & I. Michos), [in ``STACS'02'', (H. Alt, A. Ferreira, Eds.), 19th Symposium on Theoretical Aspects of Computer Science, Proceedings, March 2002], Lecture Notes in Computer Science, 2285, 477-488, Springer Verlag, 2002
22. *Quasi tilings*, (with S. Desreux & D. Rossin), [in ``Formal Power Series and Algebraic Combinatorics - 15th Conference (FPSAC'03)'', K. Eriksson, A. Björner, S. Linusson, Eds.], 12 pages, 2003
23. *Understanding the Diffusion rate of new Products through a simple Customer Behaviour Model*, (with A.S.F. Ng), [in ``IEEE 2005 International Conference on Services Systems and Services Management (ICSSSM'05)'', Jian Chen Ed.], 1, 237-243, IEEE, 2005
24. *Performance evaluation of demodulation with diversity - A combinatorial approach III: Analysis of the threshold case*, (with S. Bliudze), [in ``Proceedings of the 7th Workshop on Algorithm Engineering and Experiments and the 2nd Workshop on Analytic Algorithmic and Combinatorics'' (ANALCO'05), C. Demetrescu, R. Sedgewick, R. Tamassia, Eds.], 195-205, SIAM, 2005
25. *On optimal Hybrid ARQ control schemes for HSDPA with 16QAM*, (with N. Billy & S. Bliudze), [in ``IEEE International Conference on Wireless and Mobile Computing, Networking and Communications (WiMob'2005)'', J. Conan, S. Pierre, Eds.], 1, 121-127, IEEE, 2005
26. *Towards a Functional Formalism for Modelling Complex Industrial Systems*, (with S. Bliudze), [in ``European Conference on Complex Systems'' (ECCS'05), P. Bourguine, F. Képès, M. Schoenauer, Ed.], (article 193), 20 pages, 2005
27. *Modelling of Complex Software Systems: a Reasoned Overview*, [in ``26th IFIP WG 6.1 International Conference on Formal Methods for Networked and Distributed Systems'' (FORTE'2006), E. Najm, J.-F. Pradat-Peyre, V. Vigiú Donzeau-Gouge, Eds.], Lecture Notes in Computer Science, 4229, 1-22, Springer Verlag, 2006 (Invited speaker)
28. *Fast point-to-point shortest path queries on dynamic road networks with interval data*, (with G. Nannicini, P. Baptiste & L. Liberti), [in Book of Abstracts ``6th Cologne-Twente Workshop on Graphs and Combinatorial Optimization'' (CTW'07), J.L. Hurink, W. Kern, G.F. Post, G.J. Still, Eds.], 115-118, 2007
29. *Architecture of complex systems: why, what and how ?*, [in Proceedings of ``COgnitive systems with Interactive Sensors (COGIS'07)'', H. Aghajan, J.P. Lécadre, R. Reynaud, Eds., Electronic publication: ISBN 2 91 2 328 470], Stanford University, 1 page, 2007 (Invited speaker)
30. *Comment sécuriser la conception & le déploiement des logiciels métiers par une démarche d'architecture collaborative ?*, [in ``Journée Française des Tests Logiciels'', B. Homès, Ed.], 23 pages, CFTL, 2008
31. *Fast paths on dynamic road networks*, (with G. Nannicini, P. Baptiste & L. Liberti), [in "Proceedings of ROADEF 2008", Long Papers, A. Quillaut, Ph. Mahey, Eds.], 14 pages, Presses Universitaires de l'Université Blaise Pascal, Clermont-Ferrand, 2008
32. *Fast computation of point-to-point paths on time-dependent road networks*, (with G. Nannicini, P. Baptiste & L. Liberti), [in Proceedings of the 2nd ``International Conference on Computational Optimization and Applications'' (COCOA'08), D.Z. Du, Ed.], Lecture Notes in Computer Science, 5165, 225-234, Springer Verlag, 2008



33. *A general framework for combined module- and scale-based product platform design*, (with O. de Weck, L. Liberti & F. Marinelli), [in Proceedings of the "Second International Engineering Systems Symposium", D. Roos, Ed.], 15 pages, MIT, 2009
34. *Optimal technological architecture evolutions of Information Systems*, (with V. Giakoumakis, L. Liberti & F. Roda), [in Proceedings of the first international conference on "Complex Systems Design & Management" (CSDM 2010), M. Aiguier, F. Bretaudeau, D. Krob, Eds.], 137-148, Springer Verlag, 2010
35. *Complex Systems Architecture and Modelling*, (with M. Aiguier & B. Golden), [in Posters of the first international conference on "Complex Systems Design & Management" (CSDM 2010), M. Aiguier, F. Bretaudeau, D. Krob, Eds.], 16 pages, 2010
36. *Complex systems operational analysis - A case study for electric vehicles*, (with A. Dauron and A. Douffène), [in Posters of the 2nd international conference on "Complex Systems Design & Management" (CSDM 2011), O. Hammami, D. Krob, J.L. Voirin, Eds.], 18 pages, 2011
37. *How to use systems architecture to specify the operational perimeter of an innovative product line?*, (with J. Berrebi), [in "Proceedings of INCOSE International Symposium of 2012 (IS 2012)", M. Celentano, Ed.], 15 pages, INCOSE, 2012
38. *Complex Systems Architecture Framework. Extension to Multi-Objective Optimization*, (with A. Douffène & H. G. Chalé Gongora), [in Proceedings of the 3rd international conference on "Complex Systems Design & Management" (CSDM 2012), Y. Caseau, D. Krob, A. Rauzy, Eds.], Springer Verlag, 105-123, 2012
39. *Sharing the Total Cost of Ownership of Electric Vehicles: A Study on the Application of Game Theory*, (with A. Douffène), [in Proceedings of INCOSE International Symposium of 2013 (IS2013)], INCOSE, 2013
40. *An adequate logic for heterogeneous systems*, (with M. Aiguier & B. Golden), [in Proceedings of the 18th International Conference on Engineering of Complex Computer Systems (ICECCS' 2013), Y. Liu, A. Martin, Eds.], IEEE, 2013
41. *Model-Based operational analysis for complex systems - A case study for electric vehicles*, (with A. Douffène), [in Proceedings of INCOSE International Symposium of 2014 (IS2014)], INCOSE, May 2014
42. *Planning an Itinerary for an Electric Vehicle*, (with A. Douffène, H.G. Chalé-Gongora, O. de Weck & T. Ishimatsu), [in Proceedings of IEEE International Energy Conference 2014 (Energycon 2014)], IEEE 2014
43. *Pareto Optimality and Nash Equilibrium for Building Stable Systems*, (with A. Douffène), [in Proceedings of IEEE International Systems Conference 2015], IEEE, 2015
44. *Optimal Functional Architecture Design for the Virtual IP Multimedia Subsystem (IMS)*, (with A. Gevorgyan), [in Proceedings of INCOSE International Symposium 2016 (IS 2016)], INCOSE, July 2016
45. *Envisioning Systems Engineering as a Transdisciplinary Venture*, (with H. Sillito, J. Martin, R. Griego, D. Mc. Kinney, E. Arnold, P. Godfrey, D. Dori, S. Jackson), [in Proceedings of INCOSE International Symposium 2018 (IS2018)], 2018

### A.1.3 – Workshop & Seminar Papers

1. *Quelques exemples de séries formelles utilisées en algèbre non commutative*, [in ``Journées Traitements Algébriques et Informatiques des Séries Formelles Non Commutatives", (G. Jacob, C. Reutenauer, Eds.), Lille, December 1988], Rapport LIFL, 1989
2. *Sur une conjecture de Gelfand* (after Björk), [in ``Séminaire de Mathématique, Rouen, 1988/89"], Publications de l'Université de Rouen, 159, 85-92, PUR, 1990
3. *Partially commutative formal power series*, (with G. Duchamp), [in ``Semantics of systems of concurrent processes", (I. Guessarian, Ed.), Ecole de Printemps d'Informatique Théorique du LITP, April 1990], Lecture Notes in Computer Science, 469, 256-276, Springer Verlag, 1990 (invited speaker)
4. *Autour du problème de la hauteur d'étoile généralisée*, [in ``Actes du congrès : Journées Montoises", (V. Bruyère, Ed.), September 1990], 74-81, University of Mons-Hainaut, 1991
5. *Algèbres de Lie partiellement commutatives libres*, [in ``Séminaire de Mathématique, Rouen, 1989/90"], Publications de l'Université de Rouen, 167, 81-90, PUR, 1991
6. *Expressions rationnelles sur un anneau*, [in ``Topics in Invariant Theory, Séminaire d'Algèbre Dubreuil et M. Malliavin, 1990-1991 (40-ème année)", (M. Malliavin, Ed.)], Lecture Notes in Mathematics, 1478, 215-243, Springer Verlag, 1991
7. *Automates stochastiques, distributions de longueur des langages rationnels et hiérarchie de comptage*, (with G. Hansel et C. Michaux), [in ``Théorie des automates et applications -- Deuxièmes journées franco-belges", (D. Krob, Ed.), September 1991], Publications de l'Université de Rouen, 176, 111-122, PUR, 1993
8. *GAET : un logiciel de génération automatique d'emplois du temps*, (with P. Andary & J.P. Pécutchet), [in ``38-èmes Journées du groupe de travail européen ``Aides multicritères à la décision", Ispra (Italy), October 7-8, 1993"], 7, CCR, Commission des communautés européennes, 1993
9. *Campbell-Baker-Hausdorff type computations using noncommutative symmetric functions*, (with B. Leclerc, J.C. Novelli & J.Y. Thibon), presented at ``New Computer Technologies in Control Systems", Pereslavl-Zalessky, 1995

### A.1.4 – Thesis

1. PhD in Computer Science
  - *K-rational expressions*, March 1988, University Paris 7
  - Jury: J. Berstel (President), G. Cauchon, C. Choffrut, G. Cousineau, C. Dellacherie, D. Perrin, J.E. Pin, C. Reutenauer
2. Habilitation Thesis in Computer Science
  - *Rational identifies, free partially commutative algebraic structures and language theory*, November 1991, University Paris 7
  - Jury: M. Schützenberger (President), M. Boffa, G. Cauchon, M. Crochemore, J. Désarménien, D. Perrin, C. Reutenauer

### **A.1.5 – Books**

1. *Algorithms & Data Structure: Programing*, Ellipses, 1989
2. *Introduction to Symbolic Calculus and Experimental Mathematics – 1: the Maple System*, (with S. Legros), International Thomson Publishing France, 1996
3. *Exercices in Algorithmics – ENS Examination*, (with J.C. Bajart, H. Comon, C. Kenyon, M. Morvan, J.M. Muller, A. Petit & Y. Robert), collective book coordinated by J.C. Bajart, International Thomson Publishing France, 1997
4. *Introduction to Symbolic Calculus and Experimental Mathematics - 2: General & Linear Algebra*, (with S. Legros), Vuibert Informatique, 1999
5. *CESAM – CESAMES Systems Architecting Method*, CESAM Community, January 2017
6. *Model-Based Systems Architecting with CESAM*, 2021 (to appear)

### **A.1.6 – Contributions to Books**

1. *Chapter 4: Combinatorics in trace monoids II*, (with G. Duchamp), [in "The book of traces", (V. Diekert, G. Rozenberg, Eds.)], 83-129, World Scientific, 1995
2. *Elements of complex systems architecture*, [in "Gestion de la complexité et de l'information dans les grands systèmes critiques", A. Appriou, Ed.], 179-207, CNRS Editions, 2009
3. *Comment estimer la loi de diffusion d'un nouveau produit ? Proposition d'un modèle de comportement client*, (with A. Bloch), [in "Innovation et création d'entreprise", A. Bloch, S. Morin Delerm, Eds.], 85-105, Editions ESKA, 2010
4. *Elements of systemic modelling*, [in L'Energie à découvert, R. Mossery - C. Jeandel, Eds.], CNRS Editions, 76-77, 2013
5. *Elements of systemics – Systems architecture*, [in Complexité-Simplexité, A. Berthoz - J.L. Petit, Eds.], Editions Odile Jacob, 2013
6. *Le travail éclairé*, [in Homo Numericus Au travail, P. Beretti et A. Bloch, Eds.], Editions Economica, 19-27, 2016

### **A.1.7 – Patents**

1. *Synchronization process of the atomic clocks of the base stations of a cellular network*, (with J.L. Dornstetter, M. Morvan & L. Viennot), patent registered by Nortel Matra Cellular, 2001
2. *Propagation process of the partial traffic information in a road network*, (with P. Baptiste & L. Liberti), patent registered by V-traffic (Mediamobile), 2009
3. *Method of transaction without physical support of a security identifier and without token, secured by the structural decoupling of the personal and service identifiers*, patent registered by A3BC Group, 2015
4. *Authentication process secured by the structural decoupling of the personal and service identifiers*, patent under registration by A3BC Group, 2021

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#### **A.1.8 – Proceedings Editor**

1. *Deuxièmes Journées-Séminaire Traitements Algébrique et Informatique des Séries Formelles Non Commutatives*, (proceedings editor with G. Duchamp & G. Jacob), LIR, University of Rouen, 1990
2. *Selected papers of the second Workshop on Algebraic and Computer-Theoretic Aspects of Formal Power Series*, (special issue editor with G. Duchamp & G. Jacob), Theoretical Computer Science, 98 (1), 1992
3. *Automata theory and applications – Second French-Belgium days*, Publications de l'Université de Rouen, 176, PUR, 1993
4. *STACS'98 - 15th Annual Symposium on Theoretical Aspects of Computer Science - Paris, France, February 1998*, (proceedings editor with M. Morvan & C. Meinel), Lecture Notes in Computer Science, 1373, Springer, 1998
5. *Proceedings of the 12<sup>th</sup> colloquium on "Formal Power Series and Algebraic Combinatorics/Séries Formelles et Combinatoire Algébrique" (FPSAC/SFCA'00)*, Moscow, June 2000, (proceedings editor with A.A. Mikhalev & A.V.Mikhalev), Springer Verlag, 2000
6. *Special Issue on Dial M for Mobility: Discrete Algorithms and Methods for Mobile Computing and Communication*, (special issue editor with A. Ferreira), Mobile Networks & Applications, 6, 2001
7. *Complex Systems Design & Management – Proceedings of the First International Conference on Complex Systems Design & Management (CSD&M 2010)*, (proceedings editor with M. Aiguier & F. Bretaudeau), Springer Verlag, 2010
8. *Complex Systems Design & Management – Proceedings of the 2<sup>nd</sup> International Conference on Complex Systems Design & Management (CSD&M 2011)*, (proceedings editor with O. Hammami & J.L. Voirin), Springer Verlag, 2011
9. *17<sup>th</sup> IEEE International Conference on Complex Computer Systems (ICECCS 2012)*, (proceedings editor with K. Breitman, I. Perseil & M. Pouzet), Ecole Normale Supérieure, IEEE, July 2012
10. *Complex Systems Design & Management – Proceedings of the 3<sup>rd</sup> International Conference on Complex Systems Design & Management (CSD&M 2012)*, (proceedings editor with Y. Caseau & A. Rauzy), Springer Verlag, 2012
11. *Complex Systems Design & Management – Proceedings of the 4<sup>th</sup> International Conference on Complex Systems Design & Management (CSD&M 2013)*, (proceedings editor with M. Aiguier, F. Boulanger & C. Marchal), Springer Verlag, 2013
12. *Digital Enterprise Design & Management – Proceedings of the 1<sup>st</sup> International Conference on Digital Enterprise Design & Management (DED&M 2013)*, (proceedings editor with P.J. Bengozi & F. Rowe), Springer Verlag, 2013
13. *Complex Systems Design & Management – Proceedings of the 5<sup>th</sup> International Conference on Complex Systems Design & Management (CSD&M 2014)*, (proceedings editor with F. Boulanger, G. Morel & J.C. Roussel), Springer Verlag, 2014

14. *Digital Enterprise Design & Management – Proceedings of the 2<sup>nd</sup> International Conference on Digital Enterprise Design & Management (DED&M 2014)*, (proceedings editor with P.J. Bengozi, A. Lonjon & H. Panetto), Springer Verlag, 2014
15. *Complex Systems Design & Management Asia – Designing Smart Cities: Proceedings of the 1<sup>st</sup> Asia-Pacific Conference on Complex Systems Design & Management (CSD&M Asia 2014)*, (proceedings editor with M.A. Cardin, P.C. Lui, Y.H. Tan & K. Wood), Springer Verlag, 2014
16. *Complex Systems Design & Management – Proceedings of the 6<sup>th</sup> International Conference on Complex Systems Design & Management (CSD&M 2015)*, (proceedings editor with G. Auvray, J.C. Boquet & E. Bonjour), Springer Verlag, 2015
17. *Complex Systems Design & Management – Proceedings of the 7<sup>th</sup> International Conference on Complex Systems Design & Management (CSD&M 2016)*, (proceedings editor with G. Fanmuy, E. Goubault & F. Stephan), Springer Verlag, 2016
18. *Complex Systems Design & Management Asia – Smart Nations – Sustaining & Designing: Proceedings of the 2<sup>nd</sup> Asia-Pacific Conference on Complex Systems Design & Management (CSD&M Asia 2016)*, (proceedings editor with M.A. Cardin, S.H. Fong, P.C. Lui & Y.H. Tan), Springer Verlag, 2016
19. *Complex Systems Design & Management – Proceedings of the 8<sup>th</sup> International Conference on Complex Systems Design & Management (CSD&M 2017)*, (proceedings editor with A. Chapoutot, F. Stephan & A. Roussel), Springer Verlag, 2017
20. *Complex Systems Design & Management – Proceedings of the 9<sup>th</sup> International Conference on Complex Systems Design & Management (CSD&M 2018)*, (proceedings editor with E. Bonjour, F. Stephan & L. Palladino), Springer Verlag, 2018
21. *Complex Systems Design & Management Asia – Transporation: Proceedings of the 3<sup>rd</sup> Asia-Pacific Conference on Complex Systems Design & Management (CSD&M Asia 2018)*, (proceedings editor with M.A. Cardin, D. Hastings, P. Jackson, P.C. Lui & G. Schmitt), Springer Verlag, 2018
22. *Complex Systems Design & Management – Proceedings of the 10<sup>th</sup> International Conference on Complex Systems Design & Management (CSD&M 2019)*, (proceedings editor with G. Boy, A. Guegan & V. Vion), Springer Verlag, 2019
23. *Complex Systems Design & Management – Proceedings of the 11<sup>th</sup> International Conference on Complex Systems Design & Management (CSD&M 2020)*, (proceedings editor with A. Dauron, F. Mangeant & A. Rauzy), Springer Verlag, 2021
24. *Complex Systems Design & Management – Proceedings of the 4<sup>th</sup> International Conference on Complex Systems Design & Management Asia and of the 12<sup>th</sup> International Conference on Complex Systems Design & Management (CSD&M 2021)*, (proceedings editor with L. Lefei, J. Yao, H. Zhang, X. Zhang), Springer Verlag, 2021

## **A.2 – Teaching & Training**

### **A.2.1 – Habilitation Thesis and PhD Supervision**

#### **Habilitation Thesis Supervision**

1. R. Mantaci, *Some applications of algebraic and enumerative combinatorics*, University Paris 7, Habilitation Thesis defended by December 17, 2001

### PhD Supervision

1. P. Andary, *Agenda optimization through simulated annealing – Algorithmics of free Lie algebras*, University of Rouen, PhD defended by January 10, 1996
2. J.C. Novelli, *Combinatorics of Young tableaux & rubans*, University Paris 7, PhD defended by January 15, 1999
3. L. Le Bris, *Radio resource allocation in cellular networks*, University Paris 7, CIFRE convention with Bouygues Telecom, PhD defended by June 22, 1999
4. M. Espie, *Some combinatorial problems and their implementation*, University Paris 7, PhD defended by December 18, 2001
5. F. Derepas, *Abstraction techniques for modelling and verification of distributed systems used in cellular communication*, (in co-direction with P. Gastin), University Paris 7, CIFRE convention with Nortel Matra Cellular, PhD defended by January 15, 2002
6. S. Desreux, *Algorithmic aspects of tiling generation*, (in co-direction with M. Morvan), University Paris 7, PhD defended by July 17, 2003
7. S. Bliudze, *A framework for the study of complex industrial systems – The example of UMTS infrastructure*, Ecole Polytechnique, PhD defended by June 30, 2006
8. G. Nannicini, *Computation of fastest paths in structured networks with random dynamics: an application to road networks*, Ecole Polytechnique, CIFRE convention with Mediamobile, PhD defended by June 18, 2009
9. J. Berrebi, *Contribution to the integration of a wireless avionic connection – Systems engineering applied to an industrial problem*, Ecole Polytechnique, CIFRE convention with Airbus Group, PhD defended by February 21, 2013
10. A. Douffène, *Complex systems architecture and optimisation – Application to electric vehicles*, Ecole Polytechnique, CIFRE convention with Renault, PhD defended by March 5, 2013
11. B. Golden, *A unified formalism for complex systems architecture*, Ecole Polytechnique, PhD defended by May 2013
12. Y. Hourdel, *Study of the equivalence of systemic models*, Ecole Polytechnique, PhD defended by July 2014

### A.2.2 – Academic Training Activities<sup>5</sup>

1. 1987-1988:
  - Algorithms & Data Structure, INSA Rouen, Master of Applied Mathematics
  - Databases, INSA Rouen, Master of Applied Mathematics
  - Graph theory and linear programming, INSA Rouen, Master of Applied Mathematics

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<sup>5</sup> These lectures were provided under my full and unique responsibility.

- Numerical Analysis, INSA Rouen, Master of Applied Mathematics,
2. 1988-1989:
    - Algorithms & Data Structure, INSA Rouen, Master of Applied Mathematics
    - Rational expressions, University of Rouen, Master of Computer Science
  3. 1989-1990:
    - Rational expressions, University of Rouen, Master of Computer Science
  4. 1990-1991:
    - Symbolic calculus, University of Rouen, Master of Computer Science
    - Symbolic calculus & algebraic informatics, University of Rouen, Master of Computer Science
  5. 1991-1992:
    - Advanced Programming, University of Québec at Montréal, Master of Computer Science
    - Algebra and combinatorics, University of Québec at Montréal, Master of Mathematics
    - Rational identities, University Paris 7, Master of Theoretical Computer Science
  6. 1992-1993:
    - Combinatorics 1 & 2, Ecole Normale Supérieure, Master of Mathematics
    - Symbolic calculus, University of Rouen, Master of Computer Science
    - Theory of presented monoids, University Paris 7, Master of Theoretical Computer Science
  7. 1993-1994:
    - Combinatorics of tableaux, University Paris 7, Master of Theoretical Computer Science
    - Symbolic calculus, University of Rouen, Master of Computer Science
  8. 1994-1995:
    - Combinatorics of tableaux, University Paris 7, Master of Theoretical Computer Science
    - Elements of combinatorics, Ecole Normale Supérieure, Master of Mathematics
  9. 1995-1996:
    - Combinatorics of tableaux, University Paris 7, Master of Theoretical Computer Science
    - Elements of combinatorics, Ecole Normale Supérieure, Master of Mathematics
    - Parallel algorithmic, University Paris 7, Master of Software Engineering
  10. 1996-1997:
    - Algorithms & programming, Ecole Polytechnique, Master of Computer Science
    - Combinatorics & physics, University Paris 7, Master of Theoretical Computer Science
    - Digital signal processing, University Marne-la-Vallée, Master of Computer Science
    - Elements of combinatorics, Ecole Normale Supérieure, Master of Mathematics
  11. 1997-1998:
    - Artificial intelligence, University Paris 7, Master of Computer Science
  12. 1998-1999:
    - Algorithms for mobile communications, University Paris 7, Master of Computer Science
    - Modelling in computer science, University Paris 7, Master of Computer Science
  13. 1999-2000:
    - Algorithms for mobile communications, University Paris 7, Master of Computer Science

- Modelling in computer science, University Paris 7, Master of Computer Science
14. 2000-2001:
    - Algorithms & programming, Ecole Polytechnique, Master of Computer Science
    - Algorithms for mobile communications, University Paris 7, Master of Computer Science
    - Mobile networks, Pôle Léonard de Vinci, Master of Computer Science
  15. 2001-2002:
    - Algorithms & programming, Ecole Polytechnique, Master of Computer Science
    - Algorithms for mobile communications, University Paris 7, Master of Computer Science
    - Mobile networks, Pôle Léonard de Vinci, Master of Computer Science
  16. 2002-2003:
    - Algorithms for mobile communications, University Paris 7, Master of Computer Science
    - Introduction to information technology, EPITA, Master of Computer Science
  17. 2003-2004:
    - Algorithms for mobile communications, University Paris 7, Master of Computer Science
    - Data exchanges technology: from EDI to XML, CNAM, Master of Computer Science
    - Information technology, EPITA, Master of Computer Science
  18. 2004-2005:
    - Information technology, EPITA, Master of Computer Science
  19. 2005-2006:
    - Information technology, EPITA, Master of Computer Science
    - Information technology, HEC, MBA in Information Systems
    - Introduction to complex industrial systems, Ecole Polytechnique, Master of Design & Management of Complex Software Systems
  20. 2006-2007:
    - Information technology, EPITA, Master of Computer Science
    - Introduction to complex industrial systems, Ecole Polytechnique, Master of Design & Management of Complex Software Systems
    - Software modelling for the engineer, Ecole Polytechnique, Master of Computer Science
  21. 2007-2008:
    - Introduction to complex industrial systems, Ecole Polytechnique, Master of Design & Management of Complex Software Systems
    - Software engineering, CNAM, Master of Computer Science
    - Software modelling for the engineer, Ecole Polytechnique, Master of Computer Science
  22. 2008-2009:
    - Introduction to complex industrial systems, Ecole Polytechnique, Master of Design & Management of Complex Software Systems
    - Software engineering, CNAM, Master of Computer Science
    - Software modelling for the engineer, Ecole Polytechnique, Master of Computer Science
  23. 2009-2010:



- Introduction to complex industrial systems, Ecole Polytechnique, Master of Design & Management of Complex Software Systems
  - Software modelling for the engineer, Ecole Polytechnique, Master of Computer Science
24. 2010-2013:
- Elements of complex systems architecture, Ecole Polytechnique, Master of Design & Management of Complex Software Systems
  - Modelling of software systems, Ecole Polytechnique, Master of Computer Science
25. 2014-2019:
- Elements of complex systems architecture, Ecole Polytechnique, Master of Design & Management of Complex Software Systems

### **A.2.3 – Professional Training Activities**

#### **On-the-job Trainings**

1. *Systems architect advanced program*, design & animation of a professional training in systems architecting formed of seven 2-day modules, Alstom Transport, 2007-2008 (30 trainees)
2. *Systems architecture*, design & animation of an on-the-job training in systems architecting formed of ten 0.5-day modules, Areva, 2009 (20 trainees)
3. *Architecture of information systems*, design & animation of an on-the-job training in enterprise architecture formed of ten 2-day modules, Institute for Public Management & Economic Development, Ministry of Economy & Finances, 2009-2011 (20 trainees)
4. *Systems architecture & safety*, design & animation of an on-the-job training in systems architecture including safety, formed of ten 2-day modules, Safran, 2011- (180 trainees)
5. *Enterprise architecture*, design & animation of an on-the-job training in enterprise architecture formed of seven 2-3 day modules, Société Générale, 2012- (150 trainees)
6. *Systems architecture*, design & animation of an on-the-job training in systems architecture formed of 2 training weeks, Schneider Electric, 2011- (180 trainees)
7. *Systems architecture*, design & animation of an on-the-job training in systems architecture based on one 4-day training, Airbus Helicopters, 2016- (45 trainees)
8. *Systems architecture & safety*, design & animation of an on-the-job training in systems architecture including safety, formed of 2 training weeks, Renault (100 trainees), 2015- – Japanese version for Nissan, 2016- (45 trainees)
9. *Systems architecture & safety*, design & animation of an on-the-job training in systems architecture including safety, formed of 2 training weeks, PSA (60 trainees), 2018-
10. *Systems architecture & safety*, design & animation of an on-the-job training in systems architecture including safety, formed of 2 training weeks, Ariane Group (45 trainees), 2019-

#### **Short Trainings**

1. *Architecture of complex systems*, design & animation of a 3-day inter-enterprise professional training, 2010- (150 trainees)

2. *Introduction to systems architecting*, design & animation of 1-day, 2-day and 3-day professional trainings, exists in Chinese, French, English and Japanese, 2011- (4,500 trainees<sup>6</sup>)
3. *Product line architecture*, with L. Le Sauce, design & animation of a 2-day inter-enterprise professional training, 2015- (60 trainees)
4. *Safety*, with A. Rauzy, design & animation of a 2-day training module on model-based safety, 2012- (200 trainees)

#### **A.2.4 – Teaching Responsibilities**

1. Member of the directing committee, Ecole Polytechnique, Master in Algorithms, 1995-1999
2. Scientific adviser, Internet School of Bourges, 2001-2002
3. Scientific adviser, School for Informatics and Advanced Techniques (EPITA), 1998-2001
4. Director of the master program, School for Informatics and Advanced Techniques (EPITA), 2002-2008
5. President of the advising committee, IONIS School of Technology & Business, 2008-2012
6. Director of the master program “Engineering of Complex Industrial Systems”, Ecole Centrale de Paris, Ecole Polytechnique, Institut National des Sciences et Techniques Nucléaires, 2005-2009
7. Director of the master program “Design & Management of Complex Software Systems”, Ecole Centrale de Paris, Polytechnique, Ecole Supérieure d’Electricité, Institut National des Sciences et Techniques Nucléaires, Télécoms Paristech, 2009-2015

### **A.3 – Diffusion, Research, Business & Expertise**

#### **A.3.1 – Conference Organizations**

1. Member & secretary of the permanent program committee of the international colloquium “Formal Power Series and Algebraic Combinatorics” (FPSAC), 1991-1998
2. Member of the permanent program committee of the international “Symposium on Theoretical Aspects of Computer Science” (STACS), 1993-1995
3. Member of the organizing committee of the 7th colloquium “Formal Power Series and Algebraic Combinatorics” (FPSAC’95), Marne-la-Vallée, France, June 1995
4. President of the permanent program committee of the international “Symposium on Theoretical Aspects of Computer Science” (STACS), 1996-2003
5. President of the organizing committee of the national colloquium “See, Listen, Compute and Reason”, Paris, La Villette, June 1997
6. Member of the organizing committee of the 9th colloquium “Formal Power Series and Algebraic Combinatorics” (FPSAC’97), Wien, Austria, June 1997

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<sup>6</sup> This training was delivered world-wide in many different companies such as Airbus, Airbus Helicopters, Areva, Dassault Systèmes, Horiba, Huawei, Kawasaki Heavy Industries, Nissan, PSA, Safran, Sony, Schneider Electric, Technip or Yazaki.

7. President (with M. Morvan) of the organizing committee of the "Symposium on Theoretical Aspects of Computer Science" (STACS'98), Paris, France, February 1998
8. President of the permanent program committee of the international colloquium "Formal Power Series and Algebraic Combinatorics", 1998-2002
9. President of the organizing committee of the 12th colloquium "Formal Power Series and Algebraic Combinatorics" (FPSAC'00), Moscow, Russia, June 2000
10. President of the colloquium "Complex industrial systems: today training & research challenges, tomorrow industrial challenges", Paris, 2003
11. Scientific coordinator of the industrial symposium on Platforming, Alstom Transport, Paris, April 2006
12. President of the scientific committee of the Annual Fall Colloquium of the Computer Science Laboratory of Ecole Polytechnique: Modelling, verification, optimization, Paris, October 2007
13. Member of the permanent program of the "Systems of systems" Spring School of the Ministry of Defense, 2007-2012
14. President of the permanent program committee and all organizing committees of the international conferences on "Complex Systems Design & Management" (CSD&M), Paris, 2010-2019
15. President of the 17<sup>th</sup> IEEE "International Conference on Complex Computer Systems" (ICECCS 2012), Ecole Normale Supérieure, Paris, July 2012
16. President of all organizing committees of the international conferences on "Digital Enterprise Design & Management" (DED&M), Paris, 2013-2014
17. President (with P.C. Lui and Zhang X.G.) of the permanent program committee and all organizing committees of the Asia-Pacific conferences on "Complex Systems Design & Management" (CSD&M Asia), Singapore, 2014, 2016, & 2018 and Beijing, 2020

### **A.3.2 – Invited Talks**

1. *An overview of the 2 first years of existence of the industrial chair "Engineering of Complex Systems"*, Academic forum on systems engineering, 4<sup>th</sup> conference of the French INCOSE chapter, Toulouse, 2006
2. *Modelling of Complex Software Systems: a Reasoned Overview*, International Conference on Formal Methods for Networked and Distributed Systems - 26<sup>th</sup> edition (FORTE 2006), IFIP (TC6, WG 6.1), Paris, 2006
3. *Think the information system in an agile architecture*, Enterprise Architecture, Marcus Evans Conference, Paris, March 2007
4. *Systems of systems: concepts, problems, engineering & architecture*, Tutorial (with J. Printz), Spring school on Systems of Systems, Ministry of Defence, DGA, Paris, March 2007
5. *Architecture of complex systems: why, what and how*, COgnitive systems with Interactive Sensors (COGIS'07), Stanford University, USA, November 2007
6. *Enterprise architecture & strategic alignment*, Tutorial, Spring school on Systems of Systems, Ministry of Defence, DGA, Paris, April 2008

7. *Systems architecture & complexity reduction*, Engineering of large projects & complex systems, 3<sup>rd</sup> edition, Arcachon, France, June 2008
8. *Elements of complex systems architecture*, Genetic Regulatory Networks and other Complex Systems, GENNETEC Training Course, Paris, January 2009
9. *A short presentation of the Ecole Polytechnique chair "Engineering of Complex Systems"*, 2<sup>nd</sup> "International Engineering Systems Symposium", MIT, Cambridge (USA), June 2009
10. *Systemic modelling*, special session on Combinatorics, Physics and Complexity, 3<sup>rd</sup> International Conference on Complex Systems and Applications, ICCSA 2009, Le Havre, June 2009
11. *How to transform efficiently an organization and its information system by means of Enterprise Architecture*, After 10 years of transformation, enterprise architecture, Marcus Evans Conferences, Paris, April 2010
12. *Modular architectures: myth or reality?*, Engineering of large projects & complex systems, 6<sup>th</sup> edition, Arcachon, France, June 2011
13. *Elements of requirements engineering*, 3<sup>rd</sup> International Workshop on Model Based Safety Assessment, Versailles, March 2013
14. *Functional mockup: a new modelling paradigm for systems engineering*, SystemX Technological Institute, Paris, October 2015
15. *Product Lifecycle Management: a success story in the automotive industry*, Dassault Systèmes Forum, Paris, January 2016
16. *Elements of systems of systems architecture*, Complex systems design & management Asia (CSD&M Asia 2016), Singapore, February 2016
17. *Introduction to systems engineering*, Dassault Systèmes Japan, Tokyo, June 2016
18. *Introduction of systems engineering at enterprise scale – A success story in the automotive industry*, Ministry of Defence, DSTA, Singapore, November 2016
19. *Introduction of systems engineering at enterprise scale – The PSA case study*, Dassault Systèmes Annual Industrial Forum, Tokyo, July 2017
20. *Introduction to MBSE*, Workshop on MBSE, Tokyo, September 2017
21. *Introduction to Model Based Engineering & Safety*, Workshop on MBSE, Paris, June 2018
22. *Elements of product line architecture*, Dassault Korea Symposium, October 2018
23. *Agile@scale and agile architecting*, Agile en Seine, Paris, September 2019
24. *MBSE Why? What? How? Who?*, Huawei, October 2019
25. *Functional safety and MBSE*, CSD&M 2019, December 2019
26. *Functional safety and MBSE*, CAST 805, June 2020
27. *The challenges of systems engineering*, ATIS, Tunisia, October 2020
28. *Smart factory*, Philipp Morris, December 2020
29. *Risk Analysis*, Air Traffic Management University, Paris, January 2021

### **A3.3 – Editorial Committees**

1. Member of the editorial committee of the “Electronical Notes in Theoretical Computer Science” (Elsevier), 1997-2000
2. Member of the editorial committee of the “Proceedings in Informatics” (Carleton Scientific), 1999
3. Editor in chief of the electronic journal “Discrete Mathematics and Theoretical Computer Science”, 1998-2001
4. Member of the editorial committee of the electronic journal “Discrete Mathematics and Theoretical Computer Science”, 2001-
5. Editor in chief of the “Systems engineering” section of the electronic review “Journal of Systems and Software Engineering”, 2009-
6. Associate editor of the INCOSE journal “Systems Engineering”, 2014

### **A3.4 – Academic Research Projects**

1. Co-responsible of the “Stochastic Algorithms” project within the OMII regional research program “Mathematical & Software Tools for Industry”, 1989-1993
2. Responsible of the French-Canadian research project “Algebraic Combinatorics and Formal Power Series”, 1993-1995
3. Responsible of the “Algebraic combinatorics” team of the INTAS European research project “Computer algebra, symbolic and combinatorial tools in differential algebra and differential equations with impact in fundamental physics and control theory”, 1994-1995
4. Responsible of the Parisian team within the ALAPEDES European research project “Algebraic Approach to Performance Evaluation of Discrete Event Systems”, 1996-2000
5. Responsible of the Ecole Polytechnique team “New Models for Complex Systems” within the National research & industrial program “Software Factory”, 2006-2008
6. Responsible of the Ecole Polytechnique team within the MORPHEX European research project “Morphogenesis and gene regulatory networks in plants and animals: a complex systems modelling approach”, 2007-2010
7. Responsible of the Ministry of Defense research project “Modelling of Systems of Systems”, 2008-2009
8. Responsible of the Ministry of Defense research project “Validation of Systems of Systems”, 2009-2010

### **A3.5 – Professional Business Projects**

1. Creation of the software editor “Medience” (sold to Business Objects), 2001-2003
2. Creation & president of the systems architecture company “CESAMES”, 2011-
3. Direction of several coaching & assistance missions in systems architecture including safety (Audi, Dassault Systèmes, Huawei, PSA, Renault, Thales, Vinci, ... )

4. Direction of several coaching & assistance missions in enterprise and information systems architecture (Airbus, PSA, Société Générale, ... )
5. Direction of several major development organization transformation missions (Airbus, Areva, Bouygues Construction, Morpho, PSA, Safran Aircraft Engines, Zodiac Seats, Yazaki, ... )

### **A3.6 – Expertise Responsibilities**

1. Scientific secretary of the Computer Science section of the French National Committee for Scientific Research, 1991-1995
2. Adviser of the R&D vice-president, Nortel Networks, 1997-2000
3. President of the evaluation committee of the “Methods, Tools & Simulation” division of the “Systems of systems” department of the Ministry of Defense, 2005-2007
4. President of the evaluation committee of the “Architecture of Systems of Systems” division of the “Systems of systems” department of the Ministry of Defense, 2005-2011
5. President of the evaluation & orientation committee of the “Information management & modelling” department of the French Aerospace Laboratory (ONERA), 2008-2013
6. Member of the international normalization committee ISO/TC 184/SC 5, study group to Explore Object-Process Methodology (OPM) for Modeling Standards, dedicated to the construction of a new system modeling standard , 2010-2011
7. Member of the evaluation committee of the Microsoft chair “Optimization and Sustainable Development” of Ecole Polytechnique, 2009-2012
8. Member of the expert committee “Systems of systems” of the SystemX Technology Institute, 2013-2015
9. Scientific director of the SystemX Technology Institute, 2015-2016