

Paul Bourgine

Paul Bourgine was born in 1945. He graduated at Ecole Polytechnique. He his the head of a team “Modelling complex systems” at the Centre de Recherche en Epistémologie Appliquée (CREA), a laboratory of Ecole Polytechnique.

Having completed a doctorate dissertation in Economics, he turned to the Cognitive Sciences, and in particular to Artificial Intelligence. Having realized the limits of A.I., he turned to autonomous systems and to a broadening of his intellectual interests towards artificial life and complex adaptive systems. He now wishes to contribute to emerging transdisciplinary sciences of complex systems at the crossroad of the cognitive and of the social sciences.

He organized the first two international conferences on Economics and the Cognitive Sciences (CECOIA). He also organized the first European Conference on Artificial Life (ECAL) and the second French-Japanese conference on the synthetic worlds.

He co-edited two books : Economics and Cognitive Science by Pergamon Press et Towards a practice of autonomous systems by MIT Press/ Bradford Books.

Topics of research :

- . Complex autonomous systems
- . Coevolutionary dynamics and learning dynamics
- . Cognitive Economics
- . Viability Theory

CREA, Ecole Polytechnique, route de Saclay, 91128 - Palaiseau
tel: (336) 07 22 01 61 - fax : (331) 69 33 30 59 - email : bourgine@poly.polytechnique.fr

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- (34) Bourguine P., B. Walliser, J.L. Le Moigne (1991) : "A multidisciplinary approach for cognitive economics" in *Proceedings of Cecoia 2*, P. Bourguine and B. Walliser (eds), pp. 1-5, Pergamon Press. (35) Bourguine P., F. Varela 1992. Towards a practice of autonomous system. in *Towards a practice of autonomous system*, F.Varela & P.Bourguine (ed). MIT Press/Bradford Books.pp 3-10.
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- (40) P. Bourguine, 1992, Heuristique et Abduction, *Intelligence Artificielle et Vie Artificielle, XXII session de l'Ecole Internationale d'Informatique de l'AFCEI*.
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- (51) R. Munos, P. Bourguine, Reinforcement learning for continuous stochastic control problems, *Neural Information Processing Systems*, 1997
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- (56) P. Bourguine, 1999 : The Exploration/Exploitation Compromise : from Decision Theory to Game Theory, in *Advances in Self-Organization and Economics*, Jacques Lesourne & André Orléan (eds), Economica.
- (57) P. Bourguine, 1999 : Models of Abduction and Learning, in *Second Seminar of Advanced Studies in Semiotics*, Priscilla Farias&Lucia Santaella (eds), Sao Paolo.
- (58) P. Bourguine, B. Leloup, 2000 : The Ultimatum Supergame played with Gittins Index, Rapport du CREA.
- (59) P. Bourguine, 2001 : Models of nonreflexive abduction, in *third Seminar of Advanced Studies in Semiotics*, Maria Unice Gonzalves (ed), Sao Paolo.
- (60) B. Leloup, P. Bourguine, 2002 (to appear) The Ultimatum Supergame paradox : an explanation by learning process

Curriculum Vitae

Paul Bourguine

born 3 /11/ 1945,

218 rue du Fb Saint Martin, 75010- Paris

Adresse Professionnelle

CREA-Ecole Polytechnique, 1 rue Descartes, 75001-Paris

Tel : 33 6 60 77 69 34

Diplômes

1990 PhD in Artificial Intelligence and Artificial Life

1983 PhD in Mathematical Economics

1968-1970 ENGREF (National School in Environmental and Agricultural Engineering)

1965-1967 Ecole Polytechnique

Cursus

1995- Chairman of the « complex systems modelling» research group of CREA-Ecole Polytechnique

1987-95 Chairman of the Artificial Intelligence and Artificial Life Laboratory of CEMAGREF (National Research Center for in Environmental and Agricultural Engineering).

1985-1986 Researcher in LAFORIA at University Paris VI

1990-99 Associated researcher at GRASCE-University Aix-Marseille III and at GRID-ENS.

Expériences d'enseignement

- ENGREF : Introduction to Artificial Intelligence (85-90)
- DEA IARFA (ParisV, Paris VI, ENPC) : Heuristic Method in Problem Solving (85-90)
- IAE de Paris I : Introduction to Cognitive Science (87-91)
- DEA of Cognitive Science (University Paris VI, EHESS, Ecole Polytechnique) :
Advanced Introduction to Artificial Intelligence and Artificial Life. (90-)
- DEA Microeconomics and Decision Theory (ENS Cachan,Un. Paris XII, ENGREF) :
Economics and Cognitive Science (90-96)
- .DEA of University Aix-Marseille III : Economics and Cognitive Science (90-96)

- DEA Microeconomics and Decision Theory (ENS Cachan, Un. Paris XII, ENGREF) : Cognitive Microeconomics (97-)
- DEA of University Aix-Marseille III : Cognitive Microeconomics (97-)

Organisation de colloques et de conférences

- Co-Chair of the first international conference in "Economics and Artificial Intelligence" (CECOIA 1, Aix-en-Provence, 1986).
- Co-chair of St Riquier Workshops on Cognitive Science (St Riquier, 88,89,90).
- Co-Chair of the second international conference "Economics and Artificial Intelligence" (CECOIA 2, Paris, 1990).
- Co-organizer for the conference Cognitiva 90 (Madrid, 1990)
- Co-chair of the first European conference on Artificial Life, ECAL 91 (Paris, 1991).
- Co-chair of Rochebrune workshops on Complex Adaptive Systems (Rochebrune, 92, 93, 94, 95)
- Chair of the second franco-japanese workshop on synthetic worlds (Paris, 95).

Direction of PhD students

(H=Honorable ; TH=Très Honorable ; THF= Très Honorable avec les Félicitations)

Laurent Bochereau, Paris VI, 1988-91, Learning Theory (THF)
 Guillaume Deffuant, EHESS, 1988-91, Membranes Perceptrons (THF)
 Hilaire Epesse, ENSIA, 1991-94, Computer Aided System for Sensorial Analysis
 Isabelle Bardot, ENSIA, 1991-94, Artificial Cooker
 Pascal Rivière, Caen Un., 91-94, Large Economic Models Calibration
 Etienne Monneret, Caen Un., 92-95, Morphodynamic Learning
 Nicolas Meleau, Caen Un., 92-96, The Exploration/Exploitation Compromise in Reinforcement Learning (THF)
 Dominique Snyers, Caen Un., 92-96, Coevolutionary Dynamics
 Frédéric Petit-Singeot, Caen Un., 92-97, Negotiation Modeling
 Rémi Munos, EHESS, 92-97, Reinforcement Learning: Continuous Case (THF)
 Pierre Saurel, EHESS, 92-98, Models in Cognitive Science (THF)
 Thierry Fuhs, Caen Un., 94-98, Discrimination Learning (THF)
 Olivier Higelin, Caen Un., 93-99, Bayesian Network for Process Optimal Control(THF)
 Ronald Jonas, Ecole Polytechnique, 96-, Multilevel Topological Maps and Relative Activity
 Benoit Leloup, ENS Cachan, 97- : Exploration/Exploitation Compromise in Microeconomics
 Himadou Alou, Aix-MarseilleIII Un.,98-, Crossed Mimetic Dynamics in Economics
 Magali Sirerols, Aix-MarseilleIII Un.,98-, Institution Coevolution and Coordination Dynamics
 Yann Duzert, ENS Cachan, 99-, Economics of Knowledge

Contrats de Recherche

Tableau de bord interactif (avec Renault) : 87-93

Système expert de réparation d'un tracteur (avec Renault et le Ministère de l'Agriculture) : 88-95

Dynamique de vinification des moûts (avec l'INRA) :89-90

Qualité gustative des pommes (avec l'INRA) :89-90

Système d'aide à la conception de plans d'expérimentation en analyse sensorielle (avec l'ENSIAA et le Ministère de l'Agriculture) : 89-92

Le cuisinier artificiel (avec Kronenbourg et le Ministère de l'Agriculture) :89-93

Qualité des fromages (avec Entremont et le Ministère de l'Agriculture) : 90-93

Qualité des jus de fruits (contrat de la Communauté Economique Européenne):93-96

BIBLIOGRAPHIE

1 - Cours

- C1 *Résolution de problèmes*. (Tutorial for Cognitiva 87)
- C2 *Intelligence et Vie Artificielles*, XXIIème Ecole Internationale d'Informatique de l'AFCEI.
- C3 *Vie Artificielle* (Tutorial for Journées d'Avignon 92)
- C4 *Programmation Evolutionniste* (Tutorial for NeuroNîmes 92, 93)

3 - Direction d'ouvrages collectifs

- OC1 P. Bourguine, 1989 : *Economic Reasoning and Artificial Intelligence*, Theory and Decision 27.
- OC2 P. Bourguine et B. Walliser, 1992 : *Economics and Cognitive Science*, Pergamon Press.
- OC3 F. Varela et P. Bourguine, 1992 : *Towards a practice of autonomous systems*, MIT Press/Bradford Books.

4 - Traductions

- T1 *Autonomie et connaissance: essais sur le vivant* de Francisco Varela (Seuil, 1989)

5 - Principaux articles, rapports, mémoires, communications, participations à des ouvrages collectifs.

- (1) Bourguine P. (1983) : "Contribution à la modélisation assistée par ordinateur : systémodigraphie et système expert". Thèse de 3ème cycle d'Economie, juillet 83, Université d'Aix-en-Provence
- (2) Bourguine P.(1984) : "modélisation assistée par ordinateur: modélisation systémique et intelligence artificielle", cahiers du GRASCE, ERA-CNRS n°640, mai 84.
- (3) Bourguine P. (1984) : "Modélisation assistée par ordinateur et paradigme du Système de Traitement de l'Information." Colloque autour de l'oeuvre de H.A. Simon, mai 1984. in "Sciences de l'intelligence, Sciences de l'artificiel", Ed. Demailly et Le Moigne, Presses Universitaires de Lyon (1986).
- (4) Bourguine P. (1985) : "Résolveur de problèmes et agriculture : le projet ARPEGE". Congrès COGNITIVA, juin 85.
- (5) Bourguine P., Manou C., Peccoud D. (1985) : "Les systèmes experts et l'agriculture: besoins et perspectives", in "actes des premières journées sur les systèmes experts de gestion", Ed. Ernst, Dunod 85.
- (6) Bourguine P. (1985) : "Intelligence artificielle et systèmes à base de connaissances". Perspectives Agricoles n° 95, sept. 85.
- (7) Berthomé P., Bourguine P., Ezerzer M. et Pénadille Y. (1985) : "Contribution à l'optimisation

économique des réseaux arborescents de transport de l'eau", Houille Blanche n°3, 1987.

- (8) Bourguine P., Laurière J.L. (1985) : "Mise sous forme déclarative du résolveur ALICE à l'aide du moteur d'inférence SNARK", publications du groupe de recherche C.F. Picard n° 58.
- (9) Bourguine P., Raiman O. (1986) : "Macroeconomics as reasoning on a qualitative model", in 1st Conference "Economics and Artificial Intelligence", Ed. J.L Roos, Pergamon Press, sept. 87
- (10) Bourguine P. (1986) : "Propagation et extraction en résolution de problème", publications du groupe de recherche C.F. Picard n° 60.
- (11) Bourguine P. (1987) : "Qu'est-ce qu'un problème", publications du groupe de recherche C.F. Picard n° 63.
- (12) Bourguine P. (1987) : "Economie qualitative et Modélisation", Congrès DOSES, Office Statistique des Communautés Economiques Européennes.
- (13) Bourguine P., Espinasse B. (1987) : "Aide à la décision : une approche constructiviste", Congrès AFCET "Aide à la décision dans les organisations", 1987.
- (14) Bourguine P., Le Moigne J.L. (1987) : "The intelligence of economics and the economics of intelligence", préface de "Economics and Artificial Intelligence", Ed. J.L. Roos, Pergamon Press, 1987.
- (15) Bourguine P., Bremond B. (1988) : "renforcement optimum des réseaux d'adduction d'eau potable en zone rurale: méthodes d'avant-projet", Houille Blanche n°1, 1988.
- (16) Bourguine P., (1989): "Homo oeconomicus is also homo cogitans, homo cogitans is also homo oeconomicus", Theory and Decision, july 89, Reidel.
- (17) Bourguine P., (1989): "Connaissances abductives et compilation de connaissances", Congrès européen de systémique, Lausanne.
- (18) Bochereau L. et Bourguine P. (1989) : "Implémentation et extraction de traits sémantiques sur un réseau neuromimétique", Actes de Neuro-Nîmes 89, pp 125-143.
- (19) Bochereau L. et Bourguine P. (1990) : "Extraction of semantic features and logical rules from a multilayer neural network", Actes de IJCNN 90, Washington DC, 15-19/01/90.
- (20) Bochereau L. et Bourguine P. (1990) : "Validity domain and extraction of rules on a multilayer neural network", Actes de IJCNN 90, San Diego, 17-21/06/90.
- (21) Bochereau L. et Bourguine P. (1990) : "A Generalist/Specialist paradigm for building multilayer neural networks", Actes de IJCNN 90, San Diego, 17-21/06/90.
- (22) Bochereau L., Bourguine P. et Priso H. (1990) : "Generalist vs Specialist Neural Networks", Proc. Cognitiva 90, Madrid, 20-23/11/90.
- (23) Bochereau L., Bourguine P. et Deffuant G. (1990) : "Equivalence between Connectionist Classifiers and Logical Classifiers", in Lecture Notes in Physics 368, Springer Verlag, 1990 pp. 351-363.
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- (25) Barthélémy B., Bochereau L., Bourguine P. et Muratet G. (1990) : "Neural Networks for Simulation of Batch Reactors", Soumis le 25/05/90 au Journal of Intelligent Manufacturing.
- (26) Bochereau L., Bourguine P. et Crochon M. (1990) : "Using Neural Networks for Predicting Apple Quality from Near Infra-Red Spectra", AGENG 90, Berlin, 23-26/10/90.
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- (28) Bourguine P., J.L. Le Moigne (1990) : "les bonnes décisions sont elles optimales ou adéquates?",

proc. IFORS 90, Athènes, june 90.

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- (33) Bourguine P. (1991) : " Heuristique et Abduction ", Habilitation à diriger des travaux de recherche en Intelligence Artificielle, *Cahiers du LIUC n° 95*, Université de Caen.
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- (57) P. Bourguine, 1999 : Models of Abduction and learning, in *Second Seminar of Advanced Studies in Semiotics*, Priscilla Farias&Lucia Santaella (eds), Sao Paolo.
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- (59) P. Bourguine,2001 : Models of nonreflexive abduction, in *third Seminar of Advanced Studies in Semiotics*, Maria Unice Gonzalves (ed), Sao Paolo.
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