Curriculum Vitae

I. IDENTITY

Name	:	Francis Paul HEYLIGHEN
Place & date of birth	:	Vilvoorde, September 27, 1960
Nationality	:	Belgian

Adress office

Center "Leo Apostel", Vrije Universiteit Brussel,
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Education

- Doctorate (PhD) in <u>Sciences</u> (specialization Physics), "Summa cum Laude" (Vrije Universiteit Brussel, 1987).
  Title of the thesis: *Representation and Change. An Integrative Metarepresentational Framework for the Foundations of Physical and Cognitive Science.*
- University degree ("licenciate", i.e. comparable to MSc) in <u>Physics</u>, orientation Mathematical Physics, "Summa cum Laude" (Vrije Universiteit Brussel, 1982).
  Title of the thesis: *Contribution to the Study of the Aharonov-Bohm Effect. The Problem of Quantum Mechanics in a Multiply Connected Space* (in Dutch).
- High school: section <u>Latin-Mathematics</u> (Koninklijk Atheneum Mechelen, 1978).

Languages

Fluency (both in spoken and written language) in DUTCH, ENGLISH and FRENCH. Elementary understanding of German.

Professional Record

Oct.'00—Present:	research professor at the *Free University of Brussels (VUB)* (Belgium).
Oct. '94—Sep.'00:	Senior Research Associate for the *Fund for Scientific Research - Flanders*
Jan.'89—Sep.'94:	postdoctoral researcher for the Belgian *National Fund for Scientific Research (NFWO)*.
Oct.'88—Dec.'88:	visiting scientist at the *Research Program "Support, Survival & Culture", Institute for Andragology* of the *University of Amsterdam* (Netherlands).
Oct.'87—Sep.'88:	assistant – research associate for the *Research Council (OZR)* of the *Free University of Brussels (VUB)* (Belgium).
Oct.'83—Sep.'87:	research assistant for the Belgian *National Fund for Scientific Research (NFWO)*
Oct.'82—Sep.'83:	full-time researcher for the *International Solvay Institutes for Physics and Chemistry* .

II. EXPERIENCE AND ACHIEVEMENTS

Scientific Activities and Functions

- *chairman*, Global Brain Group
- member of the editorial board, "Journal of Memetics", "Journal of Collective Intelligence", "Entropy" and "Informatica"
- *author* of over 80 international scientific publications (see scientific file)
- *Co-Director* of the transdisciplinary research Center "Leo Apostel" at the Free University of Brussels (1995-)
- *editor* and *co-organizer* of the "Principia Cybernetica Project" (development and publication through hypermedia and electronic mail of an integrated philosophy) (1989-)
- *promotor* (main supervisor) of several PhD studies, including "A Cognitive Model of Adaptive Web Design and Navigation", defended by J. Bollen on oct. 22, 2001.
- *developer and publisher* of Principia Cybernetica Web, the first World-Wide Web (distributed hypermedia on the Internet computer network) server in Belgium (1993-)
- organizer and/or chairman of several international *congresses* (1987- , see scientific file)
- participant in the *Global Look-out Panel* of the Millennium Project, coordinated by the American Council for the United Nations University (1996)
- *administrator* of the PCP-News electronic mailing list (1995-)
- collaborator for the formation of a *European consortium* of universities for proposing an ESPRIT-project (1988-1990)
- *founder* and *secretary* of the "Transdisciplinary Research Group" (1983-1989)
- *co-founder* of VUBO, the researchers association of the Free University of Brussels (1992)
- *editor* of the "Principia Cybernetica Newsletter" (1990-)
- member of the *honorary editorial advisory board* of the "Encyclopaedia of Life Support Systems"
- *referee* for the *International Journal of Man-Machine Studies, Adaptive Behavior, Evolution and Cognition, International Journal of Human-Computer Studies, Biosystems, Complexity, Journal of Happiness Studies, Journal of Artificial Societies and Social Simulation, Foundations of Science , Natural Hazards.*
- *collaborator* with the organization of an intercontinental electronic mail network, "CYBSYS-L", on the subject of complex systems and cybernetics (1989-)
- *organizer* of many scientific seminars (in particular a series on "Creative Processes" in 1985)

Research

Fundamental, interdisciplinary research on the representation of change (time, dynamics, evolution), first within the framework of theoretical physics (quantum mechanics, relativity theory, thermodynamics), then within the framework of the cognitive and systems sciences (cybernetics, Artificial Intelligence, cognitive psychology, self-organization theories, ...). This led to the foundation of an *adaptive metarepresentation*, based on a *dynamics of distinctions*. This is a conceptual framework for the analysis and modelling of complex, self-organizing systems and their evolution. It connects directly to Turchin's "Metasystem Transition Theory"

The framework is being implemented as a computer support system for structuring complex problem domains, on the basis of adaptive hypermedia, semantic networks, and knowledge structuring algorithms. It also forms a starting point for a global evolutionary-systemic philosophy or world view, which is being developed collaboratively in the "Principia Cybernetica Project". Some of the implications of the theory have been empirically tested by means of psychological and linguistic data.

Computing

practical experience with all major types of computer applications (word processors, spreadsheets, databases, graphics, outliners, mailing, ...); good theoretical understanding of Artificial Intelligence and Systems Theory; knowledge of the programming languages HyperTalk, PROLOG, LISP and FORTRAN; experience with CDC (mainframe), MS-DOS (PC) and especially Macintosh environments; special interest in higher order, symbolic programming styles (AI, expert systems, object oriented programming...) and in man-machine interfaces (hypermedia, ...); software developed: the knowledge structuring system CONCEPTORGANIZER, an HTML editor, and a structured Web with possibility for annotation and search; special expertise in different forms of world-wide computer networking, electronic publication and information retrieval.

Communication

extensive experience with the writing and editing of papers and books (mostly in English, also in Dutch and French, see scientific file) and with speaking (scientific lectures) and discussing in public; practical experience with Desktop publishing and electronic mail; some experience with teaching and correction of tests; numerous international contacts.

Mobility

driving license B; own car; much experience with travelling abroad: most countries of Western-Europe, USA, former USSR, Iceland, Morocco, Singapore, Indonesia, Bulgaria, Sri Lanka...

Leisure Activities

Judo, yoga, photography, hiking, swimming, power training, painting, writing of poetry, ...

III. SCIENTIFIC FILE

Scientific Publications

books

1. Heylighen F. (1990): *Representation and Change. A Metarepresentational Framework for the Foundations of Physical and Cognitive Science*, (Communication & Cognition, Gent), 200 p.

2. Heylighen F., Rosseel E. & Demeyere F. (eds.) (1990): *Self-Steering and Cognition in Complex Systems. Toward a New Cybernetics,* (Gordon and Breach Science Publishers, New York), 440 p.

3. Heylighen F. (ed.) (1991): *Workbook of the 1st Principia Cybernetica Workshop* (Principia Cybernetica, Brussels-New York), 70 p.

4. Heylighen F., Joslyn C. & Turchin V. (1995) (eds.): *The Quantum of Evolution.*(Gordon and Breach Publishers, New York) (volume 45, numbers 1-4 (special issue) of "World Futures: the journal of general evolution"), 244 p.

5. Heylighen F., Bollen J. & Riegler A. (ed.) (1999): *The Evolution of Complexity* (Kluwer Academic, Dordrecht).

6. Heylighen F. & Heath M. (eds.) (2004): The Global Brain, special issue of *Technological Forecasting and Social Change* (in press)

papers in journals

7. Sjödin T. & Heylighen F. (1985): "Tachyons Imply the Existence of a Privileged Frame", *Lettere al Nuovo Cimento* (now *Europhysics Letters*) 44, p. 617-623.

8. Heylighen F. (1988): "Project voor een Transdisciplinair Onderzoekscentrum", *Nieuw Tijdschrift van de VUB* 2, p. 115-128.

9. Heylighen F. (1989): "Causality as Distinction Conservation: a theory of predictability, reversibility and time order", *Cybernetics and Systems* 20, p. 361-384.

10. Heylighen F. (1989): "On a proposal for the creation of an international network for complexity research", *Kybernetes: An International Journal of Cybernetics and General Systems* 18,5, p. 56-70.

11. Heylighen F. (1990): "Non-Rational Cognitive Processes as Changes of Distinctions", *Communication & Cognition* 23, No. 2-3, p. 165-181.

12. Heylighen F. (1990): "Classical and Non-classical Representations in Physics I", *Cybernetics and Systems* 21, p. 423-444.

13. Heylighen F. (1990): "Classical and Non-classical Representations in Physics II: Quantum mechanics", *Cybernetics and Systems* 21, p. 477-502.

14. Heylighen F. (1990): "A Structural Language for the Foundations of Physics", *International Journal of General Systems* 18, p. 93-112.

15. Heylighen F., Joslyn C. & Turchin V. (1991) : "A Short Introduction to the Principia Cybernetica Project", *Journal of Ideas* 2, #1 p. 26-29.

16. Heylighen F. (1991): "Modelling Emergence", *World Futures: the Journal of General Evolution* 31 (Special Issue on *Emergence*, edited by G. Kampis), p. 89-104.

17. Heylighen F. (1991): "Coping with Complexity. Concepts and principles for a support system", *Systemica* 8, part 1 (special issue on *Mutual Uses of Cybernetics and Science*, edited by Glanville R. & de Zeeuw G.), p. 39-55.

18. Heylighen F. (1991): "Design of a Hypermedia Interface Translating between Associative and Formal Representations", *International Journal of Man-Machine Studies* 35, p. 491-515.

16. Heylighen F. (1992): "A Cognitive-Systemic Reconstruction of Maslow's Theory of Self-Actualization", *Behavioral Science* 37, p. 39-58.

19. Heylighen F. (1992) : "Evolution, Selfishness and Cooperation", *Journal of Ideas*, Vol 2, # 4, pp 70-76.

20. Heylighen F. (1992) : "'Selfish' Memes and the Evolution of Cooperation", *Journal of Ideas* , Vol. 2, #4, pp 77-84.

21. Heylighen F. (1992): "From Complementarity to Bootstrapping of Distinctions: A Reply to Löfgren's Comments on my Proposed 'Structural Language'", *International Journal of General Systems* 21, no. 1, p. 99.

22. Van Overwalle F.J., Heylighen F., Casaer S. & Daniels M. (1992): "Preattributional and Attributional Determinants of Emotions and Expectations", *European Journal of Social Psychology* 20, p. 313-329.

23. Heylighen F. & Joslyn C. (1993): "Electronic Networking for Philosophical Development in the Principia Cybernetica Project", *Informatica* 17, No. 3, p. 285-293.

24. Heylighen F. (1993): "On Internal Representation", *Informatica*, 17, No. 3, p. 294.

25. Van Overwalle, F., & Heylighen, F. (1995): "Relating covariation information to causal dimensions through principles of contrast and invariance", *European Journal of Social Psychology.*,25, p. 435-455.

26. Heylighen F. (1995): "(Meta)systems as constraints on variation", *World Futures: the Journal of General Evolution* .45, p. 59-85.

27. Heylighen F. & Campbell D.T. (1995): "Selection of Organization at the Social Level: obstacles and facilitators of metasystem transitions", *World Futures: the Journal of General Evolution 45,* p. 181-212.

28. Heylighen F. & Joslyn C. (1995): "Towards a Theory of Metasystem Transitions", *World Futures: the Journal of General Evolution 45,* p. 1-4.

29. Heylighen F. (1997): "The Economy as a Distributed, Learning Control System", *Communication & Cognition- AI* 13, nos. 2-3, p. 207-224.

30. Heylighen F. (1997): "Publications on Complex, Evolving Systems: a citation-based survey", *Complexity* 2 (5), p. 31-36.

31. Heylighen F. (1997): "Objective, subjective and intersubjective selectors of knowledge", *Evolution and Cognition* 3:1, p. 63-67.

32. Bollen J. & Heylighen F. (1998): "A system to restructure hypertext networks into valid user models", *New Review of HyperMedia and Multimedia* 4, p. 189-213.

33. Heylighen F. (1998): "Editorial: the memetics community is coming of age", *Journal of Memetics* 2:2, p. 1-3.

34. Heylighen F. (1999): "The necessity of theoretical constructs: a rebuttal of the behaviourist approach to memetics ", *Journal of Memetics* 3:1, p. 33-37.

35. Heylighen F. (1999): "Collective Intelligence and its Implementation on the Web: algorithms to develop a collective mental map", *Computational and Mathematical Theory of Organizations* 5(3), p. 253-280.

36. Heylighen F. (1999): "Advantages and limitations of formal expression", *Foundations of Science,* 4:1, p. 25-56.

37. Heylighen F. & Bernheim J.(2000): "Global Progress I: empirical evidence for increasing quality of life", *Journal of Happiness Studies* 1 (3), p. 323-349,

38. Heylighen F. & Bernheim J. (2000): "Global Progress II: evolutionary mechanisms and their side-effects", *Journal of Happiness Studies 1(3),* p. 351-374

39. Heylighen F. (2000): "Evolutionary Transitions: how do levels of complexity emerge?", *Complexity* 6 (1), p. 53-57

40. Heylighen F. (2000): "Foundations and Methodology for an Evolutionary World View: a review of the Principia Cybernetica Project", *Foundations of Science,* 5, p. 457-490.

41. Heylighen F. (2001): "Bootstrapping knowledge representations: from entailment meshes via semantic nets to learning webs", *Kybernetes* 30 (5/6), p. 691-722.

42. Heylighen F. & Dewaele J-M. (2002): "Variation in the contextuality of language: an empirical measure", *Foundations of Science 6,* p. 293-340

43. Heylighen F. & C. Gershenson (2003): "The Meaning of Self-organization in Computing", *IEEE Intelligent Systems* 18:4, p. 72-75.

44. Heylighen F. & Bernheim J. (2004): "From Quantity to Quality of Life: r-K selection and human development", *Social Indicators Research.*   [in press]

45. Bernheim, J. L. , P.Theuns, P. Ponce, F. Heylighen, M. Mazaheri, M. Rose (2004): "Anamnestic Comparative Self Assessment (ACSA) to control for cultural and other relativity biases in QOL research", *Social Indicators Research.*   [in press]

46. Heylighen F. (2004): "Mediator Evolution: a general scenario for the origin of dynamical hierarchies", *Artificial Life*   [submitted]

47. Heylighen F. (2004): "Conceptions of a Global Brain: an historical review", *Technological Forecasting and Social Change* [submitted]

48. Heylighen F. (2004): "The Global Superorganism: an evolutionary-cybernetic model of the emerging network society", *Journal of Collective Intelligence* [submitted]

49. Heylighen F. (2004): "Complexity and Information Overload in Society: why increasing efficiency leads to decreasing control", *Technological Forecasting and Social Change* [submitted]

50. Heylighen F. (2004): "Tackling Complexity and Information Overload: from intelligence amplification and attention economy to the global brain", *Technological Forecasting and Social Change* [submitted]

papers in books

51. Heylighen F. (1986): "Towards a General Framework for Modelling Representation Changes", in: *Proc. 11th Int. Congress on Cybernetics*, (Assoc. Internat. de Cybernétique, Namur), p. 136-141.

52. Heylighen F. (1987): "Formal Foundations for an Adaptive Metarepresentation", in: *Cybernetics and Systems: the Way Ahead V*2 J. Rose (ed.), (Thales, St. Annes-on-Sea, Lancashire), p. 648-651.

53. Heylighen F. (1988): "Building a Science of Complexity", in: Proc. 1988 Annual Conference of the Cybernetics Society, H.A. Fatmi (ed.), (Cybernetics Society, King's College, London), p. 1-22.

54. Heylighen F. (1988): "Formulating the Problem of Problem-Formulation", in: *Cybernetics and Systems '88*, Trappl R. (ed.), (Kluwer Academic Publishers, Dordrecht), p. 949-957.

55. Heylighen F. (1989): "Self-Organization, Emergence and the Architecture of Complexity", in: *Proceedings of the 1st European Conference on System Science*, (AFCET, Paris), p. 23-32.

56. Heylighen F. (1989): "A Support System for Structuring Complex Problem Domains", in: *Proc. 12th Int. Congress on Cybernetics* (Assoc. Intern. de Cybernétique, Namur), p. 1025-1032.

57. Heylighen F. (1990): "A New Transdisciplinary Paradigm for the Study of Complex Systems?", in: *Self-Steering and Cognition in Complex Systems*, Heylighen F., Rosseel E. & Demeyere F. (ed.), (Gordon and Breach, New York), p. 1-16.

58. Boden M., Geyer F., Maturana H., Pask G. & Heylighen F. (1990): "Old and New Cybernetics: a panel discussion", in: *Self-Steering and Cognition in Complex Systems*, Heylighen F., Rosseel E. & Demeyere F. (ed.), (Gordon and Breach, New York), p. 33-46.

59. Heylighen F. (1990): "Autonomy and Cognition as the Maintenance and Processing of Distinctions", in: *Self-Steering and Cognition in Complex Systems*, Heylighen F., Rosseel E. & Demeyere F. (ed.), (Gordon and Breach, New York), p. 89-106.

60. Heylighen F. (1990): "Relational Closure: a mathematical concept for distinction-making and complexity analysis", in: *Cybernetics and Systems '90*, R. Trappl (ed.), (World Science, Singapore), p. 335-342.

61. Van Overwalle F.J. & Heylighen F. (1991): "Invariantiekenmerken bij antecedente condities en attributionele dimensies: waarnemen van oorzaken, verwachtingen en emoties", in: *Fundamentele Sociale Psychologie (deel 5)*, J. van der Pligt, W. van der Kloot, A. van Knippenberg & M. Poppe (eds.) (Tilburg University Press, Netherlands), p. 44-60.

62. Heylighen F. (1991): "An Evolutionary System about Evolutionary Systems: Introducing the Principia Cybernetica Project", in: *Workbook of the 1st Principia Cybernetica Workshop*, Heylighen F. (ed.) (Principia Cybernetica, Brussels-New York), p. 1-6.

63. Heylighen F. (1991): "Evolutionary Foundations for Metaphysics, Epistemology and Ethics", in : *Workbook of the 1st Principia Cybernetica Workshop*, Heylighen F. (ed.) (Principia Cybernetica, Brussels-New York), p. 33-39.

64. Heylighen F. (1991): "Structuring Knowledge in a Network of Concepts", in : *Workbook of the 1st Principia Cybernetica Workshop*, Heylighen F. (ed.) (Principia Cybernetica, Brussels-New York), p. 52-58.

65. Heylighen F. (1991): "Cognitive Levels of Evolution: pre-rational to meta-rational", in: *The Cybernetics of Complex Systems - Self-organization, Evolution and Social Change*, F. Geyer (ed.), (Intersystems, Salinas, California), p. 75-91.

66. Heylighen F. (1992): "Non-Rational Cognitive Processes as Changes of Distinctions", in: *New Perspectives on Cybernetics. Self-Organization, Autonomy and Connectionism*, G. Van de Vijver (ed.), (Synthese Library v. 220, Kluwer Academic, Dordrecht), p. 77-94. [reprint of 8.]

67. Heylighen F. (1992): "Principles of Systems and Cybernetics: an evolutionary perspective", in: *Cybernetics and Systems '92*, R. Trappl (ed.), (World Science, Singapore), p. 3-10.

68. Heylighen F. (1992): "Distinction Dynamics: from mechanical to self-organizing evolution", in: *Proc. of the Int. Workshop "Analysis and Control of Dynamical Systems"*, E. Gindev (ed.), (CLCS, Bulgarian Academy of Sciences, Sofia).   `[in press]`

69. Joslyn C., Heylighen F. & Turchin V. (1993): "Synopsys of the Principia Cybernetica Project", in: *Proc. 13th Int. Congress on Cybernetics* (Association Internationale de Cybernétique, Namur), p. 509-513.

70. Heylighen F. (1993): "Selection Criteria for the Evolution of Knowledge", in: *Proc. 13th Int. Congress on Cybernetics* (Association Internat. de Cybernétique, Namur), p. 524-528.

71. Heylighen F. (1994) "Fitness as Default: the evolutionary basis for cognitive complexity reduction", in: *Cybernetics and Systems '94,* R. Trappl (ed.), (World Science, Singapore), p.1595-1602.

72. Heylighen F. (1994): "World-Wide Web: a distributed hypermedia paradigm for global networking", in: *Proceedings of SHARE Europe, Spring 1994, "The Changing Role of IT in Business"* (SHARE Europe, Geneva), p. 355-368.

73. Heylighen F. & Joslyn C. (1995): "Systems Theory", in: *The Cambridge Dictionary of Philosophy*, R. Audi (ed.) (Cambridge University Press, Cambridge), p.784-785.

74. Heylighen F. (1996): "Application of the World-Wide Web for the Development and Publication of a Systems Encyclopedia", in: *Proc. 14th Int. Congress on Cybernetics* (Association Internat. de Cybernétique, Namur), p. 256-260.

75. Heylighen F. & Bollen J. (1996) "The World-Wide Web as a Super-Brain: from metaphor to model", in: *Cybernetics and Systems '96* R. Trappl (ed.), (Austrian Society for Cybernetics).p. 917-922.

76. Bollen J. & Heylighen F. (1996) "Algorithms for the Self-organisation of Distributed, Multi-user Networks. Possible application for the future World Wide Web", in: *Cybernetics and Systems '96* R. Trappl (ed.), (Austrian Society for Cybernetics), p. 911-916.

77. Heylighen F. (1996): "Evolution of Memes on the Network", in: *Ars Electronica Festival 96. Memesis: the future of evolution*, G. Stocker & C. Schöpf (eds.) (Springer, Vienna/New York), p. 48-57.

78. Heylighen F. (1997): "Auf dem Weg zum 'Global Brain'. `Der Mensch im weltweiten electronischen Netz", in: *Der Sinn der Sinne*, Uta Brandes & Claudia Neumann (Eds.) (Steidl Verlag, Göttingen), p. 302-318.

79. Bollen J. & Heylighen F. (1997): "Dynamic and adaptive structuring of the World Wide Web based on user navigation patterns", Proceedings of the Flexible Hypertext Workshop (Macquarie Computing Reports, Sydney), p. 13-17.

80. Heylighen F. (1999): "What makes a meme successful?", in: *Proc. 15th Int. Congress on Cybernetics* (Association Internat. de Cybernétique, Namur), p. 418- 423.

81. Bollen, J., Heylighen F. & van Rooy D. (1998): "Improving Memetic Evolution in Hypertext and the WWW", in: *Proc. 16th Int. Congress on Cybernetics* (Association Internat. de Cybernétique, Namur), p. 449-454.

82. Heylighen F. (1999): "The Growth of Structural and Functional Complexity during Evolution", in: F. Heylighen, J. Bollen & A. Riegler (eds.) *The Evolution of Complexity* (Kluwer Academic, Dordrecht), p. 17-44.

83. Heylighen F. (1999): "Evolution and Complexity: an introduction to the book", in: F. Heylighen, J. Bollen & A. Riegler (eds.) *The Evolution of Complexity* (Kluwer Academic, Dordrecht).

84. Joslyn C. & Heylighen F. (1999): "Cybernetics", in: *The Encyclopedia of Computer Science*, D. Hemmendinger, A. Ralston & E. Reilly (eds.) (Nature Publishing Group, London), p. 470-473.

85. Heylighen F. (2002): "The Science of Self-organization and Adaptivity", in: L. D. Kiel, (ed.) Knowledge Management, Organizational Intelligence and Learning, and Complexity, in: *The Encyclopedia of Life Support Systems* ((EOLSS), (Eolss Publishers, Oxford). [http://www.eolss.net]

86. Heylighen F. (2001): "Mining Associative Meanings from the Web: from word disambiguation to the global brain", in: *Proceedings of the International Colloquium: Trends in Special Language & Language Technology,* R. Temmerman & M. Lutjeharms (eds.) (Standaard Editions, Antwerpen), p. 15-44.

87. Heylighen F. & Bernheim J.(2001): "Measuring Global Progress Through Subjective Well-Being", in: *Proceedings of the III Conference of the ISQOLS* (University of Girona Press), p. 515-528.

88. Heylighen F. & Joslyn C. (2001): "Cybernetics and Second Order Cybernetics", in: R.A. Meyers (ed.), *Encyclopedia of Physical Science & Technology* (3rd ed.), Vol. 4 , (Academic Press, New York), p. 155-170.

89. Heylighen F. & Bollen J. (2002): "Hebbian Algorithms for a Digital Library Recommendation System", in *Proceedings 2002 International Conference on Parallel Processing Workshops* (IEEE Computer Society Press)

90. Gershenson, C. and F. Heylighen (2003). "When Can we Call a System Self-organizing?", In Banzhaf, W, T. Christaller, P. Dittrich, J. T. Kim, and J. Ziegler (eds.), Advances in Artificial Life, 7th European Conference, ECAL 2003, (Springer, LNAI 2801.), p. 606-614.

91. Heylighen F. (2004): "Das Globale Gehirn als neue Utopia", in: R. Maresch & F. Rötzer (eds.) *Renaissance der Utopie* (Suhrkamp, Frankfurt)

92. Gershenson, C. and F. Heylighen (2004). How can we think the complex? in: Richardson, Kurt (ed.) Managing the Complex Vol. 1: Philosophy, Theory and Application.(Institute for the Study of Coherence and Emergence/Information Age Publishing)   [submitted]

93. Gershenson C., Heylighen F. (2004): Protocol Requirements for Self-organizing Artifacts: Towards an Ambient Intelligence, in: *Proc. Int. Conf. on Complex Systems* (New England Institute of Complex Systems)

94. Heylighen F., Heath M., F. Van Overwalle (2004): The Emergence of Distributed Cognition: a conceptual framework, Proceedings of Collective Intentionality IV, Siena (Italy) (http://www.istc.cnr.it/collintIV/authors.htm),

95. Heylighen A., Heylighen F., Bollen J. &, Mathias Casaer M. (2005): Unconscious Contributions: Applying a connectionist model to design knowledge exchange, Proceedings of Social Intelligence Design 2005, R. Fruchter (ed.).

96. Van Overwalle, F., Heylighen, F., Heath M. (2004): From Communication between Individuals to Collective Beliefs, submitted for Proceedings of Collective Intentionality IV, Siena (Italy), preprint

Invited Lectures

- *Grondslagen van de natuurkunde als fundamenteel taalprobleem* for the Colloquium on "Fysica en Filosofie" (Limburg University Center, Belgium, March 1985)
- *From Well-Structured to Complex Problem Domains,* for the Seminars of the Institute of Andragology (University of Amsterdam, Netherlands, May 1988).
- *Closure as a Dynamic Criterion for Constructing Meaningful Distinctions,* for the Seminars of the Institute of Andragology (University of Amsterdam, Netherlands, July 1988).
- *Representaties van Dynamica en Dynamica van Representaties,* course given at the Summer School on "Zelforganizatie van Cognitieve Systemen" (University of Groningen, Netherlands, Aug. 1988)
- *Building a Science of Complexity,* for the "International Congress of the Cybernetics Society" (Birkbeck College, London, U.K., Sep. 1988).
- *Coping with Complexity,* keynote paper for the Intern. Congress "Support, Society and Culture: Mutual Uses of Cybernetics and Science" (University of Amsterdam, Netherlands, March 1989).
- *Distinction Dynamics,* for the Workshop on "Analysis and Control of Dynamic Systems" (Bulgarian Academy of Sciences, Blagoevgrad, Bulgaria, November 1989).
- Invitation by the Soviet Association for Artificial Intelligence to lecture at the USSR "National Conference on Artificial Intelligence" (Minsk, USSR, October 1990): lecture postponed.
- *Levels of complexity: the quasi-hierarchy of closure in self-organizing systems* Workshop on "Complexity in Physics and Technology" (Instituto Superior Tecnico, Lisbon, Portugal, April 1991).
- *Distinction-Making in Conceptual Networks* and *The Principia Cybernetica Project,* 7th International Conference on "Computing and Philosophy" (University of Central Florida, Orlando, USA, Aug. 1992)
- *World-Wide Web: a distributed hypermedia metaphor for computer networking,* SHARE Europe Conference (IBM Centre, La Hulpe, Belgium, April 1994).
- *Why Does Complexity Grow during Evolution?,* for the Washington Evolutionary Systems Society (Washington DC, USA, June 1996)

- *The Brain Metaphor for Global Networking*, for the Agents Research Group of the Goddard Space Flight Center, NASA. (Washington DC, USA, June 1996)
- *Evolution of Memes on the Network,* Ars Electronica Symposium on "Memesis: the future of evolution" (Linz, Austria, Sept. 1996).
- *Towards A Global Brain:* "Foundations" seminar series of the Center Leo Apostel, (Brussels, Jan. 1997).
- *Integrating Individuals into the World-Wide Electronic Network,* Int. Congress "The Sense of the Senses" (Bonn, Germany, Feb. 1997).
- *Van world-wide web tot globaal brain,* VVBAD Symposium "Informatie '97" (Brussels, Belgium, Sept. 1997).
- *Techniques to support the emergence of collective intelligence on the Net,* Workshop on Emergent Semantic and Computational Processes in Distributed Information Systems (Los Alamos National Laboratory, USA, August 10-11, 1998)
- Participation as a "leading thinker" in the Humanity 3000 Seminar and Symposium, (Foundation for the Future, Seattle, USA, April 1999 and September 2000)
- *Mining Associative Meanings from the Web,* International Colloquium: Trends in Special Language & Language Technology (Flemish Parliament, Brussels, March 2001)
- *Towards a Learning and Thinking Web*, workshop on "The Intelligent Web" (Barcelona, Oct. 2001).

Organization of Conferences

- *International Symposium and Workshop on "Self-steering and Cognition in Complex Systems: toward a New Cybernetics"* (VUB, Belgium, May 20-23, 1987): co-organizer and co-chairman, together with E. Rosseel and F. Demeyere.
- *Summer school on "Zelforganizatie van Cognitieve Systemen"* (State University of Groningen, Netherlands, 1988): co-organizer together with G.J. Dalenoort, coordinator for the VUB.
- *1st Workshop of the Principia Cybernetica Project: computer-supported cooperative development of an evolutionary-systemic philosophy* (VUB, Belgium, July 2-5, 1991): general chairman of the conference.
- *Symposium "the Principia Cybernetica Project"*, as part of the 13th Intern. Congress on Cybernetics (Namur, Belgium, August 1992): symposium chairman
- *Symposium "Cybernetic Principles of Knowledge Devlopment",* as part of the 12th European Meeting on Cybernetics and Systems Research (Vienna, Austria, April 1994), symposium chairman together with S. Umpleby
- *Symposium "The Evolution of Complexity,"* as part of the international congress "Einstein meets Magritte" (VUB, Belgium, June 1995): chairman
- *Symposium "Theories and Metaphors of Cyberspace",* as part of the 13th European Meeting on Cybernetics and Systems Research (Vienna, Austria, April 1996), symposium chairman together with S. Umpleby
- 1st *Symposium on "Memetics",* as part of the 15th Intern. Congress on Cybernetics (Namur, Belgium, August 1998): symposium chairman together with Mario Vaneechoutte
- *Workshop "From Intelligent Networks to the Global Brain"* (VUB, Belgium, July 3-5, 2001): general chairman of the conference.

Distinctions

- Runner-up in the competition for the best masters thesis presented in physics in 1982 (Belgian Physics Society).
- *International Award* for the best paper on the theme of "Interactive Interfaces between Collective Support Systems and their Users" (Centre for Innovation and Cooperative Technology, University of Amsterdam, Netherlands, 1990).
- *Best Paper Award* for the Symposium "General Systems Methodology" at the 11th European Meeting on Cybernetics and Systems Research (Vienna, Austria, 1992).
- *Grant (100,000 BF) from the "Cultural Support Fund"* of the Free University of Brussels for deserving researchers (1992).
- *Honorable Mention* in the "Best of the Web" international competition for World-Wide Web hypertext servers (for Principia Cybernetica Web, in the category "Document Design", 1994).
- *Biographical Listings* in:
    - *Who's Who in the World* (16th ed.) (Marquis Who's Who, New Providence, NJ, 1999)
    - *The International Who's Who of Intellectuals* (10th ed.) (International Biographical Centre, Cambridge, UK, 1993,)

- *International Directory of Distinguished Leadership* (4th. ed.) (American Biographical Institute, Raleigh NC, 1992).
- *5000 Personalities of the World* (4th. ed.) (American Biographical Institute, Raleigh NC, 1993).
- election in 2001 as *Fellow* of the *World Academy of Art and Science* (www.worldacademy.org), a select group "chosen for eminence in the arts, the natural and social sciences, and the humanities"
- articles about my work have appeared in newspapers and magazines around the world, including New Scientist, Frankfurter Algemeine Zeitung, Die Zeit, and Le Monde.

Membership of Scientific Associations

- Belgische Natuurkundige Vereniging (1982 - 1984)
- Belgian Association for Artificial Intelligence (1983 -)
- Communication & Cognition (1984 - 1990)
- European Society for the Study of Cognitive Systems (1987 - 1990)
- Transdisciplinary Research Group (founding member and secretary, 1983 -)
- Association Internationale de Cybernétique (membre à titre scientifique, 1990 -)

Participation in International Conferences

contributing lectures

- 11th International Congress on Cybernetics (Namur, Belgium, 1986) with a talk entitled *Towards a General Framework for Modelling Representation Changes* (section 'Styles and Types of Knowledge Manipulation')
- Studiedag over onderzoek in logica, wetenschapsfilosofie en taalfilosofie (UCL, Belgium, 1987) with *Towards an Adaptive Metarepresentation*
- International Symposium and Workshop on Self-Steering and Cognition in Complex Systems: toward a New Cybernetics (Brussels, Belgium, 1987) with *Autonomy and Cognition as the Maintenance and Processing of Distinctions*
- 5th Workshop of the European Society for the Study of Cognitive Systems (Bern, Switzerland, 1987) with *Classical and Non-Classical Representations in Physics*
- 7th International Congress of Cybernetics and Systems (London, U.K., 1987) with *Formal Foundations for an Adaptive Metarepresentation* (section 'Information Processing')
- Communication & Cognition 20th anniversary (Ghent, Belgium, 1987) with *Non-Classical Cognitive Processes as Changes of Distinctions* (section 'Second Cybernetics')
- 9th European Meeting on Cybernetics and Systems Research (Vienna, Austria, 1988) with *Formulating the Problem of Problem-Formulation* (section 'Artificial Intelligence')
- 12th International Congress on Cybernetics (Namur, Belgium, 1989) with a talk entitled *Design of a support system for structuring complex problem domains* (section 'Man-Machine Interface')
- 1st European Congress on System Science (Lausanne, Switzerland, 1989) with *Self-Organization, Emergence and the Architecture of Complexity* (section 'Niveaux d'organisation')
- 10th European Meeting on Cybernetics and Systems Research (Vienna, Austria, 1990) with *Relational Closure* (section 'Humanity, Architecture and Conceptualization')
- 8th International Congress of Cybernetics and Systems (New York, USA, 1990) with *Cognitive Levels of Evolution: from pre-rational to meta-rational* (section 'Cybernetics and Human Values')
- 2nd Meeting of the Euro-Working Group on Decision Support Systems (Bruges, Belgium, 1991) with *Knowledge Structuring in Hypermedia Systems*
- 1st Workshop of the Principia Cybernetica Project (Free University of Brussels, Belgium, 1991) with *An Evolutionary System about Evolutionary Systems; Evolutionary Foundations for Metaphysics, Epistemology and Ethics*, and *Structuring Knowledge in a Network of Concepts*
- 11th European Meeting on Cybernetics and Systems Research (Vienna, Austria, 1992) with *Principles of Systems and Cyberrnetics* (symposium 'General Systems Methodology')
- 13th International Congress on Cybernetics (Namur, Belgium, August 1992) with two talks entitled *Basic Concepts of the Principia Cybernetica Project* and *Selection Criteria for the Evolution of Knowledge* (Symposium 'The Principia Cybernetica Project')
- 12th European Meeting on Cybernetics and Systems Research (Vienna, Austria, April 1994), with *Fitness as Defaults* and a computer demonstration of the *Principia Cybernetica Web*
- international congress "Einstein meets Magritte" (VUB, Belgium, June 1995) with *Concepts and Principles underlying the Growth of Complexity during Evolution*
- 14th International Congress on Cybernetics (Namur, Belgium, August 1995) with *Application of the World-Wide Web for the Development and Publication of a Systems Encyclopedia*

- 13th European Meeting on Cybernetics and Systems Research (Vienna, Austria, April 1996), with *The World-Wide Web as a Super-Brain*
- 15th International Congress on Cybernetics (Namur, Belgium, August 1998) with*What makes a meme successful?*
- III th Conference of the ISQOLS (University of Girona, Spain, July 2000) with *Measuring Global Progress Through Subjective Well-Being*,

attendance without lecture

- Les fondements de la mécanique quantique (Montana, Switzerland, 1983)
- Conference on Evolutionary Epistemology (RUG, Belgium, 1984)
- George Sarton Centennial (RUG, Belgium, 1984)
- Laws of Nature & Human Conduct (Honda Foundation-Solvay Institute, Brussels, Belgium, 1985)
- The Press and New Technologies (FAST, EEC, Brussels, Belgium, 1985)
- 7th European Conference on Artificial Intelligence (Brighton, U.K., 1986)

Study Visits

- 3 months at the Research Program "Support, Survival & Culture", Institute for Andragology of the University of Amsterdam, Netherlands (Oct.-Dec. 1988).
- 3 weeks at the Systems Science Department of the State University of New York at Binghamton, USA (June 1990).
- 3 weeks at the Los Alamos National Laboratory and the Santa Fe Institute, New Mexico, USA (August 1998).

Research Funds Received

- several smaller grants from the research council (OZR) of the Free University of Brussels
- "Funding of Individual Researchers" (200,000 BF, 1993) from the Belgian National Fund for Scientific Research.
- three grants (500,000 BF in 1992, and 6 x 200,000 BF + a research assistant for 1994-95, and 1996-1999) from the "Fund for Collective Fundamental Research" (FKFO).

Additional Publications

smaller publications (newsletters, abstracts, popularizing journals or books...)

92. Heylighen F. (1983): "Le Contrôle du Chaos", *"O": tijdschrift voor filosofische beproevingen* 4, p. 53-58.

93. Heylighen F. (1984): "Het Transcenderen van de CS-code", *"O": tijdschrift voor filosofische beproevingen* 7, p. 119-142.

94. Heylighen F. (1987): "Non-Classical Cognitive Processes as Changes of Distinctions", in: *Abstracts of the Int. Congress "Communication and Cognition 20: Applied Epistemology"*, F. Vandamme, M. Spoelders, G. Van de Vijver, J. Van Dormael (eds.), (Communication & Cognition, Gent), p. 123-124.

95. Heylighen F., Joslyn C. & Turchin V. (1990): "Introductory Issue", *Principia Cybernetica Newsletter* 0, (Nov. 1990), p. 1-14.

96. Heylighen F. (1991): "Structuring ↔ Destructuring", in: *Addenda & Errata. The OOC Ockham Coffee-Table Book*, J. De Jong, (ed.), (Thesis, Amsterdam), p. 31-33.

97. Heylighen F. (1993): "Introduction (to the Principia Cybernetica Symposium)", in: *Proc. 13th Int. Congress on Cybernetics* (Association Internat. de Cybernétique, Namur), p. 507-508.

98. Heylighen F. (1993): "Conclusion (of the Principia Cybernetica Symposium)", in: *Proc. 13th Int. Congress on Cybernetics* (Association Internat. de Cybernétique, Namur), p. 549-550.

99. Heylighen F. (1992) : "Het gebruik van electronic mail op de VUB", VUBO Nieuwsbrief 1, p. 4-6.

100. Heylighen F. (1992) : "VUBO: een nieuwe vereniging van en voor VUB-onderzoekers", VUB-Magazine 7, nr. 2, p. 57-59.

101. Heylighen F. (1995) : "De theorie die zichzelf verwerkelijkt. Goochelaar Heinz Von Foerster en de cybernetica"

102. Heylighen F. (1996): "Vom World Wide Web zum globalen Gehirn. Die Gestaltung eines Nervensystems für d

103. Bernheim J. & Heylighen F. (1997): "Rechten, plichten, en redelijke verwachtingen", De Morgen, 8 October 199

104. Bernheim J. & Heylighen F. (1998): "Quality of Life as the criterium of Global Progress", Abstract Int. Congress

105. Bernheim J., Heylighen F. & Veenhoven R. (1998): "Maken mensenrechten gelukkig?", De Morgen, 16 december

106. F. Heylighen (2002): "Un outil universel?", in: *Education Nationale: des idées à rebrousse-poil,* C. Rochet (ed.) (Corlet-Panoramiques, Condé-sur-Noreau, France) p. 214-216.

107. Bernheim J., Heylighen F. (2003): Bonheur et Progrès: une Exploration. *Médi-Sphere Hebdo* 189: p. 23-29,

108. Bernheim J., Heylighen F. (2003): Geluk en Vooruitgang: een verkenning. *Medi-Sfeer* 189, p. 23-29.

technical reports

109. Heylighen F. (1982): Topological Superselection Rules and the Aharonov-Bohm Effect, (VUB/TF/82/04, Theoretical Physics Department, VUB).

110. Heylighen F. & D. Girardin (1986): Representation as Guidance System, (Working Group "Science, Religion and Culture" , VUB).

111. Heylighen F. (1987): Activiteiten van de Transdisciplinaire Werkgroep, (Transdisciplinary Research Group, VUB).

112. Heylighen F. (1987): Organizatie van een Transdisciplinair Centrum aan de VUB, (Transdisciplinary Research Group, VUB).

113. Heylighen F. (1988): Representaties van Dynamica en Dynamica van Representaties, lecture notes for the course given at the summer school on "Zelforganizatie van Cognitieve Systemen" (Psychology Dept., State University of Groningen, Netherlands).

114. Joslyn C. , Heylighen F. & Turchin V. (1992) : "The Principia Cybernetica Project" (Principia Cybernetica Technical Report).

115. Van Overwalle F.J. & Heylighen F.: "Covariation and Contrast under Time and Task Constraints: evidence for an invariance rule?"

116. Heylighen F. & Bollen J.: "Development and Publication of Systems Knowledge on the Internet",

117. Heylighen F. & Bernheim J.: "Global Progress: an empirical analysis and an evolutionary framework" (Working paper for the CLEA study group "Evolution and Progress")

non-print publications

118. Heylighen F., Joslyn C. & Turchin V. (eds.) (1993-2000): "Principia Cybernetica Web" (http://pespmc1.vub.ac.be/), ca. 1600 cross-linked hypertext pages.

119. Participation in the television documentary (1998): "Das Hirn friszt Stauf. Von Bibliothek zum Globalen Gehirn" (WDR, 3rd German channel).