

## Selected Publications of S.N. Salthe Classified by Topic

(First author\*)

### Developmental Systems Theory

1989. Self-organization of / in hierarchically structured systems. *Systems Research* 6: 199-208.
1993. *Development and Evolution: Complexity and Change in Biology*. Cambridge, MA: MIT Press. 357 pp.
1993. Development in sociocultural systems. *World Futures: Journal of General Evolution* 38: 165-169.
1993. Development and evolution as aspects of self-organization. In M. Sintonen and S. Sirén (eds) *Theory of Evolution: In Need of a New Synthesis? Philosophical Studies From the University of Tampere*, 50: 5-18.
1993. Should prediction or historical uniqueness be the central focus of biology? *Folia Baeriana* 6. *Baer and Modern Biology*. Pp. 247- 260.
1995. A Peircean semiotic interpretation of development. *Ludus Vitalis* 3: 15-28.
1995. The overall pattern of the evolution of information in dissipative, material systems. *World Futures: The Journal of General Evolution* 49: 445-453.
1998. Semiosis as development. In J. Albus and A. Meystel (eds) *Proceedings of the 1998 IEEE ISIC / CIRA / ISAS On Intelligent Systems* : 730-735. Gaithersburg: IEEE Press.
2000. Energy, development and semiosis. In E. Taborsky (ed) *Semiosis, Evolution, Energy: Towards a Reconciliation of the Sign*. Aachen: Shaker Verlag. Pp, 245-261.
2001. Natural philosophy and developmental systems. *Systems Research and Behavioral Science* 18: 403-410.
2004. The natural philosophy of ecology: developmental systems ecology. *Ecological Complexity* 1: 1-19.
2004. The origin of new levels in dynamical hierarchies. *Entropy* 2004, 6 [3], 327 -343.
2005. Asymmetry and self-organization. *Symmetry, Culture and Science* 16: 133-148.
2008. Natural Philosophy: developmental systems in the thermodynamic perspective. In Festschrift in honor of Teoman Durali. C,Çakmak (ed) Istanbul: Dergah Yayinlari. Pp. 442-456.
2009. A hierarchical framework for levels of reality. *Axiomathes* 19: 87-99.
2010. Development (and evolution) of the Universe. *Foundations of Science* 15:

### Ecology

1985. *Evolving Hierarchical Systems: Their Structure and Representation*. New York: Columbia University Press. 343. Pp.

2000. Ecology and Infodynamics: A review essay of R.E. Ulanowicz, 1997. *Ecology, The Ascendent Perspective. Journal of Social and Evolutionary Systems* 21: 223-237.
2001. *Theoretical Biology* as an anticipatory text: the relevance of Uexküll to current issues in evolutionary systems. *Semiotica* 134: 359-380.
2002. An exercise in the natural philosophy of ecology. *Ecological Modelling* 158: 167-179.
2003. Infodynamics, a developmental framework for ecology / economics. *Conservation Ecology* 7 (online) <http://www.consecol.org/vol7/iss3/art3>.
2004. The natural philosophy of ecology: developmental systems ecology. *Ecological Complexity* 1: 1-19.
2008. Review of Peter J. Taylor, 2005, *Unruly Complexity: Ecology, Interpretation, Engagement*. *The Quarterly Review of Biology* 82: 73.
2008. Vitalism versus physical-chemical explanations. S.E. Jørgensen and B.D. Fath (eds.) *The Encyclopedia of Ecology*. Elsevier. Volume 5: 3694-3699.
2009. Economies evolve by energy dispersal. *Entropy*, 2009 11:606-633. (with A. Annila\*)

### **Evolutionary Biology (natural selection)**

1972. *Evolutionary Biology*. New York: Holt, Rinehart and Winston. 437 pp.
1975. Problems of macroevolution (molecular evolution, phenotype definition, and canalization) as seen from a hierarchical viewpoint. *American Zoologist* 15: 295-314.
1977. A Darwinian interpretation of hindlimb variability in frog populations. *Evolution* 31: 737-749 (with M.L. Crump)
1989. Evolution in thermodynamic perspective: an ecological approach. *Biology and Philosophy* 4: 373-405. ( with D.J. Depew\*, C. Dyke, E.D. Schneider, R.E. Ulanowicz, B. Weber and J.S. Wicken)
1993. *Development and Evolution: Complexity and Change in Biology*. Cambridge, MA: MIT Press. 357 pp.
1998. The role of natural selection theory in understanding evolutionary systems. In G. Van de Vijver, M. Delpo and S.N. Salthe (eds) *Evolutionary Systems*. Dordrecht: Kluwer Academic. Pp. 13-20.
2005. The cosmic bellows: the Big Bang and the Second Law. *Cosmos and History* 1: 295-318. ( with Gary Fuhrman)
2005. Semiotics in biology: inside neoDarwinism. *Journal of Biosemiotics* 1: 505-518. Reprinted in M. Barbieri (ed) *Biosemiotic Research Trends*. New York: Nova Science. Chapter 12.
2008. Natural selection in relation to complexity. *Artificial Life* 14: 363-374. (special edition on the Evolution of Complexity)
2009. Visions of evolution: self-organization proposes what natural selection disposes. *Biological Theory* 3:17-29. (with D. Batten\* and F. Boschetti)
2009. Darwin and some leading ideas in Western culture. *Ludus Vitalis* 18: 173-178.

2010. Physical foundations of evolutionary theory. *Journal of Non-equilibrium Thermodynamics* (with A. Annala\*)

## Hierarchy Theory

1982. An extensional definition of functional individuals. *American Naturalist* 121: 139-144

1984. Hierarchy and evolution. *Oxford Surveys of Evolutionary Biology* 1: 184-208. (with N. Eldredge\*)

1985. From Cartesian dualism through dual aspect complementarities to hierarchical resolution. *Proc. Soc. Gen. Syst. Res.* 1985, Volume L: 118-120.

1985. *Evolving Hierarchical Systems: Their Structure and Representation*. New York: Columbia University Press.

1988. Notes toward a formal history of the levels concept. In G. Greenberg and E. Tobach (eds) *Evolution of Social Behavior and Integrative Levels*. Hillsdale, NJ: L. Erlbaum Associates.

1989. Self-organization of / in hierarchically structured systems. *Systems Research and Behavioral Science* 6: 199-208.

1991. Hierarchical non-equilibrium self-organization as the new post-cybernetic perspective. *Communication and Cognition* 23: 157-164. Reprinted in G. Van de Vijver (ed) *New Perspectives on Cybernetics* 1992, Dordrecht: Kluwer Academic., pp. 49-58.

1991. Two forms of hierarchy theory in Western discourse. *International Journal of General Systems* 18: 251-264.

1993. *Development and Evolution: Complexity and Change in Biology*. Cambridge, MA: MIT Press, 357 pp.

1995. Self-organization in hierarchical systems. *Journal of Social and Evolutionary Systems* 18: 327-338. (with K. Matsuno)

1996. Self-organization in hierarchical systems. In Ehresman, A. and J.-P. Vanbremeersch (eds) *Actes du Symposium ECHO Emergence – Complexité Hiérarchique – Organisation: Modèles de la Boucle Evolutive*. Pp. 150-155. Amiens: Université de Picardie Jules Verne.

1997. Modeling anticipative systems. In G. Lasker, D. Dubois and B. Teilung (eds) *Advances in Modeling of Anticipative Systems*. International Institute for Advanced Studies in Systems Research and Cybernetics.

2000. A classification of closure concepts. *Annals of the New York Academy of Sciences* 901: 35-41.

2002. Summary of the principles of hierarchy theory. *General Systems Bulletin* 31: 13-17.

2004. The origin of new levels in dynamical hierarchies. *Entropy* 2004, 6: 327-343.

2005. An approach to causality in organized complexity: the role of management. In K. Richardson (ed) *Managing the Complex: Philosophy, Theory, Practice* I.A.P./I.S.C.E. Managing the Complex Book Series Vol. 1: 81-94.

2005. Meaning in Nature: placing biosemiotics in pansemiotics. *Journal of Biosemiotics* 1: 211-221. Reprinted in 2007, *Biosemiotics: Information, Codes and Signs in Living Systems*. M. Barbieri (ed) New York: Nova, Ch. 10.
2006. Two frameworks for complexity generation in biological systems. *Evolution of Complexity. ALifeX Proceedings*. C. Gershenson and T. Lenaerts (eds). Bloomington, IN: Indiana University Press. <http://ecco.vub.be/EDO/Salthe.pdf>
2008. Ecological Boundaries in the context of hierarchy theory. *BioSystems* (with M.M. Yarrow\*)
2008. Systems as quantized actuality, applied to hierarchies. *General Systems Bulletin* 37: 13-14.
2009. A hierarchical framework for levels of reality: understanding through representation. *Axiomathes*, 19: 87-99.
2010. Review of E.T. Wimberley, *Nested Ecology: The Place of Humans in the Ecological Hierarchy*. Johns Hopkins University Press, 2009. *Environmental Conservation* 36: 353.

### **Information Dynamics (infodynamcs)**

1990. Sketch of a logical demonstration that the global information capacity of a macroscopic system must behave entropically when viewed internally. *Journal of Ideas* 1: 51-56.
1993. *Development and Evolution: Complexity and Change in Biology*. Cambridge, MA: MIT Press, 357 pp.
2000. Ecology and Infodynamics: A review essay of R.E. Ulanowicz, 1997. *Ecology, The Ascendent Perspective. Journal of Social and Evolutionary Systems* 21: 223-237.
2001. What is infodynamics? In G. Ragsdell and J. Wilby (eds) *Understanding Complexity*. New York: Plenum Pp. 71-90.
2003. Infodynamics, a developmental framework for ecology / economics. *Conservation Ecology* 7 (online) <http://www.consecol.org/vol7/iss3/art3>.
2005. Asymmetry and self-organization. *Symmetry, Culture and Science* 16: 133-148.
2006. What is the scope of biosemiotics? Information in living systems. In M. Barbieri (ed) *Introduction to Biosemiotics: The New Biological Synthesis*. Dordrecht: Springer-Verlag. Ch.5.

### **Internalism**

1993. *Development and Evolution: Complexity and Change in Biology*. Cambridge, MA: MIT Press, 357 pp.
1995. Self-organization in Hierarchical systems. *Journal of social and Evolutionary Systems* 18: 327-338. (with K. Matsuno)
1995. Global idealism / local materialism. *Biology and philosophy* 10: 309-337. (with K. Matsuno\*)

1996. Where is the internal observer located? *Contemporary Philosophy. Revue de la Pensée d'aujourd'hui* 24-11: 110-116. (in Japanese)
2001. *Theoretical Biology* as an anticipatory text: the relevance of Uexküll to current issues in evolutionary systems. *Semiotica* 134: 359-380.
2002. The origin and development of time. *International Journal of General Systems* 31: 377-393. (with K Matsuno\*)
2004. The natural philosophy of ecology: developmental systems ecology. *Ecological Complexity* 1: 1-19.
2008. Symmetry breaking in Islamic weavings. *Symmetry: Culture and Science* 19: 183-198.

### **Maximum Entropy Production Principle**

1993. *Development and Evolution: Complexity and Change in Biology*. Cambridge, MA: MIT Press, 357 pp.
2002. The natural philosophy of entropy. *SEED Journal (Semiotics, Evolution, Energy and Development)* 2: 29-41.
2002. An exercise in the natural philosophy of ecology. *Ecological Modelling* 158: 167-179.
2003. Infodynamics, a developmental framework for ecology / economics. *Conservation Ecology* 7 (online) <http://www.consecol.org/vol7/iss3/art3>.
2004. The natural philosophy of ecology: developmental systems ecology. *Ecological Complexity* 1: 1-19.
2004. The origin of new levels in dynamical hierarchies. *Entropy* 2004, 6: 327-343.
2005. Asymmetry and self-organization. *Symmetry, Culture and Science* 16: 133-148.
2005. Energy and semiotics: the Second Law and the Origin of Life. *Cosmos and History* 1: 129-145.
2005. The cosmic bellows: the Big Bang and the Second Law. *Cosmos and History* 1: 295-318. (with G. Fuhrman)
2007. The natural philosophy of work. *Entropy*, 2007, 9: 83-99.
2008. Natural Philosophy: developmental systems in the thermodynamic perspective. *In Festschrift in honor of Teoman Durali*. C.Çakmak (ed) Istanbul: Dergah Yayinlari. Pp. 442-456.
2009. Economies evolve by energy dispersion. *Entropy* 2009, 11: 606-633. (with A. Annala\*)
2010. Physical foundations of evolutionary theory. *Journal of Non-equilibrium Thermodynamics* (with A. Annala\*)
2008. Vitalism versus physical-chemical explanations. S.E. Jørgensen and B.D. Fath (eds.) *The Encyclopedia of Ecology*. Elsevier. Volume 5: 3694-3699.
2010. Cultural naturalism. *Entropy*, 2010 12: 1325-1352. (with A. Annala\*)

## Natural Philosophy

1985. From Cartesian dualism through dual aspect complementarities to hierarchical resolution. *Proc. Soc. Gen. Syst. Res. 1985*, Volume L: 118-120.
1990. The evolution of the biosphere: towards a new mythology. *World Futures: The Journal of General Evolution* 30: 53-68.
1991. Formal considerations on the origin of life. *Uroboros* 1: 45-65. Reprinted in 1998, W. Lugowski and K. Matsuno (eds), *Uroboros: Biology Between Mythology and Philosophy*. Wroclaw: Arboretum.
1991. Varieties of emergence. *World Futures* 32: 69-93.
1992. Science as the basis for a new mythological understanding. *Uroboros* 2: 25-45. Reprinted in 1998, W. Lugowski and K. Matsuno (eds), *Uroboros: Biology Between Mythology and Philosophy*. Wroclaw: Arboretum.
1993. *Development and Evolution: Complexity and Change in Biology*. Cambridge, MA: MIT Press, 357 pp.
1993. Development in sociocultural systems. *World Futures: Journal of General Evolution* 38: 165-169.
1993. Development and evolution as aspects of self-organization. In M. Sintonen and S. Sirén (eds) *Theory of Evolution: In Need of a New Synthesis? Philosophical Studies From the University of Tampere*, 50: 5-18.
1993. Creativity in natural science. *WESSComm* 3: 30-33.
1995. The overall pattern of the evolution of information in dissipative, material systems. *World Futures: The Journal of General Evolution* 49: 445-453.
1999. A semiotic attempt to corral creativity via generativity. *Semiotica* 127: 481-495.
2000. A classification of closure concepts. *Annals of the New York Academy of Sciences* 901: 35-41.
2000. Implicate final causes in developing material systems. *International Journal of General Systems* 29: 965-987. ( with K. Matsuno\*)
2001. Natural philosophy and developmental systems. *Systems Research and Behavioral Science* 18: 403-410.
2002. Representing the riches of our past and new hope for our future. *World Futures: The Journal of General Evolution*. 58: 149-157.
2002. The origin and development of time. *International Journal of General Systems* 31: 377-393. (with K. Matsuno\*)
2002. The natural philosophy of entropy. *SEED* 2/2. <http://www.library.utoronto.ca/SEE>. Click on SEED
2002. An exercise in the natural philosophy of ecology. *Ecological Modelling* 158: 167-179.
2003. Entropy: what does it really mean? *General Systems Bulletin* 32: 5-12.
2004. Biology and beyond biology: the natural path to the future. In D. Loye (ed) *The Great Adventure: Towards a Fully Human Theory of Evolution*. Albany: State University of New York Press. Pp. 53-63.
2004. Natural philosophy in the Twenty-First Century. *General Systems Bulletin* 33: 8-9.

2004. To be and then not to be: our myth from science. *Kutagubilig: Journal of Philosophy-Science Research* 5: 179-197 (English version).
2005. Asymmetry and self-organization. *Symmetry, Culture and Science* 16: 133-148.
2005. Energy and semiotics: the Second Law and the Origin of Life. *Cosmos and History* 1: 129-145.
2005. The cosmic bellows: the Big Bang and the Second Law. *Cosmos and History* 1: 295-318. (with Gary Fuhrman)
2006. On Aristotle's conception of causality. *General Systems Bulletin* 35: 11.
2007. The natural philosophy of work. *Entropy*, 2007, 9: 83-99.
2008. Vitalism versus physical-chemical explanations. *The Encyclopedia of Ecology*. S.E, Jørgensen and B.D. Fath (eds) Amsterdam: Elsevier. Vol. 5: 3694-3699.
2008. Natural Philosophy: developmental systems in the thermodynamic perspective. In Festschrift in honor of Teoman Durali. C,Çakmak (ed) Istanbul: Dergah Yaylinlari. Pp. 442-456.
2008. The system of interpretance: naturalizing meaning as finality. *Biosemiotics* 1: 285-294.
2008. Purpose in Nature. *Ludus Vitalis* 16: 49-58.
2009. A hierarchical framework for levels of reality: understanding through representation. *Axiomathes*, 19: 87-99.
2009. A Review of *Signature in the Cell: DNA and the Evidence for Intelligent Design*. by S.C. Meyer. New York: Harper One, 2009. *Philosophy Pathways*, Issue 146, 19 August, 2009. <http://www.philosophypathways.com/newsletter/>
2009. Monstrous fate: the problem of authorship and evolution by natural selection. *Annals of Scholarship* 19: 45-66.
2010. Darwin and some leading ideas in Western culture. *Ludus Vitalis* 18: 173-178.
2010. Physical foundations of evolutionary theory. *Journal of Non-equilibrium Thermodynamics* (with A. Annala\*)
2010. Development and evolution of the universe. In *The Evolution and Development of the Universe*. J. Smart and C. Vidal (eds.) *Foundations of Science*, special edition. <http://evodevouniverse.com> <http://arxiv.org/abs/0912.5508>

## **Semiotics**

1993. *Development and Evolution: Complexity and Change in Biology*. Cambridge, MA: MIT Press, 357 pp.
1995. A Peircean semiotic interpretation of development. *Ludus Vitalis* 3: 15-28.
1998. Naturalizing semiotics: an extended review of J. Hoffmeyer, 1996, *Signs of Meaning in the Universe*. *Semiotica* 120: 389-394.
1998. Semiosis as development. In J. Albus and A. Meystel (eds) *Proceedings of the 1998 IEEE ISIC / CIRA / ISAS On Intelligent Systems* : 730-735. Gaithersburg: IEEE Press.

1999. A semiotic attempt to corral creativity via generativity. *Semiotica* 127: 481-495.
2000. Energy, development and semiosis. In E. Taborsky (ed) *Semiosis, Evolution, Energy: Towards a Reconception of the Sign*. Aachen: Shaker Verlag. Pp 245-261.
2000. Translation into and out of language. *Athanor X*, n.s. No. 2: 167-177. Reprinted in S. Petrilli (ed) *Translation*. Amsterdam: Editions Rodopini, pp. 283-296.
2001. *Theoretical Biology* as an anticipatory text: the relevance of Uexküll to current issues in evolutionary systems. *Semiotica* 134: 359-380.
2005. Energy and semiotics: the Second Law and the Origin of Life. *Cosmos and History* (1): 129-145.
2005. Meaning in Nature: placing biosemiotics in pansemiotics. *Journal of Biosemiotics* 1: 211-221. Reprinted in 2007, *Biosemiotics: Information, Codes and Signs in Living Systems*. M. Barbieri (ed) New York: Nova, Ch. 10.
2005. Semiotics in biology: inside neoDarwinism. *Journal of Biosemiotics* 1: 505-518. Reprinted in M. Barbieri (ed) *Biosemiotic Research Trends*. New York: Nova Science. Chapter 12.
2006. What is the scope of biosemiotics? Information in living systems. In M. Barbieri (ed) *Introduction to Biosemiotics: The New Biological Synthesis*. Dordrecht: Springer-Verlag. Ch.5
- 2008, On K. Matsuno's paper. "Molecular semiotics toward the emergence of Life. *Biosemiotics* 1: 145-146.
2008. Symmetry breaking in Islamic weavings. *Symmetry: Culture and Science* 19: 183-198.
2009. The system of interpretance: naturalizing meaning as finality. *Biosemiotics* 1: 285-294.
2009. Inside / outside: a review of Søren Brier's 'Cybersemiotics: Why Information Is Not Enough.' *Biosemiotics* 2: 247-253.
2010. What is semiotics? Review of *The Routledge Companion to Semiotics*, Paul Cobley (ed) New York: Routledge. *Biosemiotics* 4: 245-251.