

# Wim Hordijk, Ph.D.

## Publications

### Journals and proceedings

- 59.** W. Hordijk. Autocatalytic sets and RNA secondary structure. *Journal of Molecular Evolution* 84(4):153–158, 2017.
- 58.** W. Hordijk and M. Steel. Chasing the tail: The emergence of autocatalytic networks. *BioSystems* 152:1–10, 2017.
- 57.** R. Cazzolla Gatti, W. Hordijk and S. Kauffman. Biodiversity is autocatalytic. *Ecological Modelling* 346:70–76, 2017.
- 56.** V. Di Cola et al. ecospat: an R package to support spatial analyses and modeling of species niches and distributions. *Ecography* (in press), 2017.
- 55.** W. Hordijk. Evolution: Limited & predictable or unbounded & lawless? *Biological Theory* 11(4):187–191, 2016.
- 54.** W. Hordijk and M. Steel. Autocatalytic sets in polymer networks with variable catalysis distributions. *Journal of Mathematical Chemistry*, 54(10):1997–2021, 2016.
- 53.** W. Hordijk. Evolution of autocatalytic sets in computational models of chemical reaction networks. *Origins of Life and Evolution of Biospheres* 46(2):233–245, 2016.
- 52.** W. Hordijk and M. Steel. Comment on “Tibor Gánti and Robert Rosen” by Athel Cornish-Bowden. *Journal of Theoretical Biology* 392:122–123, 2015.
- 51.** P. Nghe, W. Hordijk, S. A. Kauffman, S. I Walker, F. J. Schmidt, H. Kemble, J. A. M. Yeates and N. Lehman. Prebiotic network evolution: six key parameters. *Molecular BioSystems* 11:3206–3217, 2015.
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- 49.** W. Hordijk, A. Hordijk and B. Heidergott. A genetic algorithm for finding good balanced sequences in a customer assignment problem with no state information. *Asia-Pacific Journal of Operational Research* 32(3):1550015, 2015.
- 48.** F. L. Sousa, W. Hordijk, M. Steel and W. F. Martin. Autocatalytic sets in *E. coli* metabolism. *Journal of Systems Chemistry* 6:4, 2015.
- 47.** W. Hordijk and M. Steel. Autocatalytic sets and boundaries. *Journal of Systems Chemistry* 6:1, 2015.
- 46.** W. Hordijk. The algorithmic mind and what it means to solve a problem. *Emergence: Complexity & Organization* 16(4), 2014.
- 45.** W. Hordijk and M. Steel. Conditions for evolvability of autocatalytic sets: A formal example and analysis. *Origins of Life and Evolution of Biospheres* 44(2):111–124 , 2014.
- 44.** A. Filisetti, M. Villani, C. Damiani, A. Graudenzi, A. Roli, W. Hordijk and R. Serra. On RAF sets and autocatalytic cycles in random reaction networks. *Communications in Computer and Information Science*, 445:113–126, 2014.

- 43.** W. Hordijk, L. Hasenclever, J. Gao, D. Mincheva and J. Hein. An investigation into irreducible autocatalytic sets and power law distributed catalysis. *Natural Computing*, 13(3):287–296, 2014.
- 42.** W. Hordijk, N Vaidya and N Lehman. Serial transfer can aid the evolution of autocatalytic sets. *Journal of Systems Chemistry* 5:4, 2014.
- 41.** J. I Smith, M. Steel and W. Hordijk. Autocatalytic sets in a partitioned biochemical network. *Journal of Systems Chemistry* 5:2, 2014.
- 40.** W. Hordijk, P. R. Wills and M. Steel. Autocatalytic sets and biological specificity. *Bulletin of Mathematical Biology* 76(1):201–224, 2014.
- 39.** W. Hordijk. Autocatalytic sets: From the origin of life to the economy. *BioScience* 63(11):877–881, 2013.
- 38.** M. Steel, W. Hordijk and J. Smith. Minimal autocatalytic networks. *Journal of Theoretical Biology* 332:96–107, 2013.
- 37.** D. W. McShea and W. Hordijk. Complexity by subtraction. *Evolutionary Biology* 40(4):504–520, 2013.
- 36.** W. Hordijk. The EvCA project: A brief history. *Complexity* 18(5):15–19, 2013.
- 35.** W. Hordijk and M. Steel. A formal model of autocatalytic sets emerging in an RNA replicator system. *Journal of Systems Chemistry* 4:3, 2013.
- 34.** W. Hordijk, M. Steel and S. Kauffman. The structure of autocatalytic sets: Evolvability, enablement, and emergence. *Acta Biotheoretica* 60(4):379–392, 2012.
- 33.** W. Hordijk and M. Steel. Autocatalytic sets extended: Dynamics, inhibition, and a generalization. *Journal of Systems Chemistry* 3:5, 2012.
- 32.** W. Hordijk and O. Broennimann. Dispersal routes reconstruction and the minimum cost arborescence problem. *Journal of Theoretical Biology* 308:115–122, 2012.
- 31.** R. Engler, W. Hordijk and A. Guisan. The `MIGCLIM` R package – seamless integration of dispersal constraints into projections of species distribution models. *Ecography* 35(10):872–878, 2012.
- 30.** A. Espíndola, L. Pellissier, L. Maiorano, W. Hordijk, A. Guisan and N. Alvarez. Predicting present and future intra-specific genetic structure through niche hindcasting across 24 millenia. *Ecology Letters* 15(7):649–657, 2012.
- 29.** W. Hordijk and M. Steel. Predicting template-based catalysis rates in a simple catalytic reaction model. *Journal of Theoretical Biology* 295:132–138, 2012.
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- 27.** W. Hordijk, J. Hein and M. Steel. Autocatalytic sets and the origin of life. *Entropy* 12(7):1733–1742, 2010.
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- 24.** P. Vajda, A. E. Eiben and W. Hordijk. Parameter control methods for selection operators in genetic algorithms. In G. Rudolph et al. (eds.), *Parallel Problem Solving from Nature — PPSN X*, Springer, pp. 620–630, 2008.
- 23.** S. Paulson, W. Hordijk, P. Gift, Subarani and Shanmugam. Design of an interleaver for turbo codes using genetic algorithms. *International Journal of Artificial Intelligence and Machine Learning* 6(2):1–5, 2006.
- 22.** W. Hordijk. An overview of biologically inspired computing in information security. In K. Anbumani (ed.), *Proceedings of the National Conference on Information Security*, pp. 1–14, 2005.
- 21.** W. Hordijk. An introduction to evolutionary computation. In K. Krithivasan and R. Rama (eds.), *Formal Language Aspects of Natural Computing*, pp. 77–84, 2005.
- 20.** W. Hordijk. An overview of computation in cellular automata. In K. Krithivasan and R. Rama (eds.), *Formal Language Aspects of Natural Computing*, pp. 7–16, 2005.
- 19.** W. Hordijk and O. Gascuel. Improving the efficiency of SPR moves in phylogenetic tree search methods based on maximum likelihood. *Bioinformatics* 21(24):4338–4347, 2005.
- 18.** W. Hordijk and S. A. Kauffman. Correlation analysis of coupled fitness landscapes. *Complexity* 10(6):41–49, 2005.
- 17.** L. M. Rocha and W. Hordijk. Material representations: From the genetic code to the evolution of cellular automata. *Artificial Life* 11(1-2):189–214, 2005.
- 16.** W. Hordijk and M. Steel. Detecting autocatalytic, self-sustaining sets in chemical reaction systems. *Journal of Theoretical Biology* 227(4):451–461, 2004.
- 15.** C. Semple, P. Daniel, W. Hordijk, R. D. M. Page and M. Steel. Supertree algorithms for ancestral divergence dates and nested taxa. *Bioinformatics* 20(15):2355–2360, 2004.
- 14.** T. Biyikoglu, W. Hordijk, J. Leydold, T. Pisanski and P. F. Stadler. Graph laplacians, nodal domains, and hyperplane arrangements. *Linear Algebra and its Applications* 390:155–174, 2004.
- 13.** C. Fried, W. Hordijk, S. J. Prohaska, C. R. Stadler and P. F. Stadler. The footprint sorting problem. *Journal of Chemical Information and Computer Sciences* 44:332–338, 2004.
- 12.** W. Hordijk and J. F. Fontanari. Catalytic reaction sets, decay, and the preservation of information. In *Proceedings of the IEEE International Conference on Integration of Knowledge Intensive Multi-Agent Systems*, pp. 133–138, 2003.
- 11.** P. F. Stadler, W. Hordijk and J. F. Fontanari. Phase transition and landscape statistics of the number partitioning problem. *Physical Review E* 67:056701, 2003.
- 10.** W. Hordijk, J. F. Fontanari and P. F. Stadler. Shapes of tree representations of spin-glass landscapes. *Journal of Physics A* 36:3671–3681, 2003.
- 9.** D. Rockmore, P. Kostelec, W. Hordijk and P. F. Stadler. Fast fourier transform for fitness landscapes. *Applied and Computational Harmonic Analysis* 12(1):57–76, 2002.
- 8.** W. Hordijk, C. R. Shalizi and J. P. Crutchfield. Upper bound on the products of particle interactions in cellular automata. *Physica D* 154:240–258, 2001.
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- 6.** W. Hordijk and P. F. Stadler. Amplitude spectra of fitness landscapes. *Advances in Complex Systems* 1(1):39–66, 1998.

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4. W. Hordijk, J. P. Crutchfield and M. Mitchell. Embedded-particle computation in evolved cellular automata. In T. Toffoli, M. Biafore, and J. Leão (eds.), *PhysComp96*, New England Complex Systems Institute, pp. 153–158, 1996.
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2. W. Hordijk. A measure of landscapes. *Evolutionary Computation* 4(4):335–360, 1996.
1. W. Hordijk and B. Manderick. The usefulness of recombination. In F. Morán, A. Moreno, J. J. Merelo and P. Chacón (eds.), *Advances in Artificial Life, Proceedings of the Third European Conference on Artificial Life*, Springer-Verlag, pp. 908–919, 1995.

## Book chapters

2. W. Hordijk. Correlation analysis of coupled fitness landscapes. In H. Richter and A. Engelbrecht (eds.), *Recent Advances in the Theory and Application of Fitness Landscapes*, Springer, pp. 369–393, 2013.
1. W. Hordijk, M. Steel and S. Kauffman. Autocatalytic sets: The origin of life, evolution, and functional organization. In P. Pontarotti (ed.), *Evolutionary Biology: Exobiology and Evolutionary Mechanisms*, Springer, pp. 49–60, 2013.

## Other contributions

19. W. Hordijk. Cause and process in evolution. *Extended Evolutionary Synthesis Blog*, May 17, 2017.  
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18. W. Hordijk. Grottes de Vallorbe. *Swiss Vistas*, May 2, 2017.  
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17. W. Hordijk. Citizen science: Facts or fake news? *Plus magazine*, March 20, 2017.  
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14. W. Hordijk. Spontaneous spirals. *Plus magazine*, December 22, 2016.  
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7. W. Hordijk. The living set. *The Scientist*, June 1, 2015.  
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4. W. Hordijk. Recognizing the illusion of 'Homo Economicus'. *NPR 13.7*, July 20, 2014.  
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## Theses

2. W. Hordijk. *Dynamics, Emergent Computation, and Evolution in Cellular Automata*. Ph.D. dissertation, University of New Mexico, 1999.
1. W. Hordijk. *Population Flow on Fitness Landscapes*. Unpublished undergraduate thesis, 1994.