

Introduction to Artificial Life (Alife)

Computational Modeling Lab

Computer Science Department

Vrije Universiteit Brussel

<http://como.vub.ac.be>



- **COMO?**

- **Members;**

- B. Manderick, A. Nowé, K. Verbeeck, J . Parent

- N. De Bruyne, T. Lenaerts, P. van Remortel and A. Defaweux

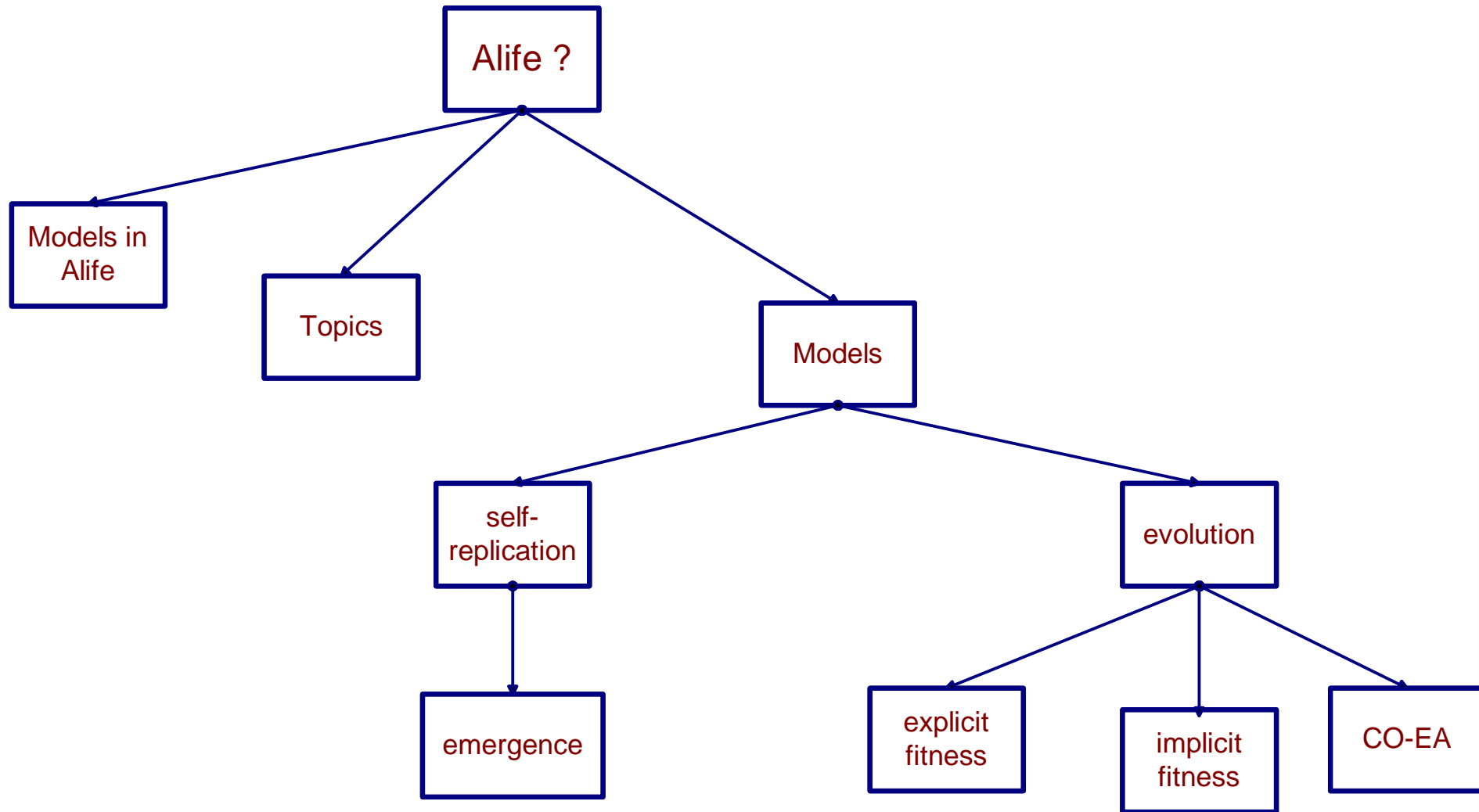
- **Research**

- Reinforcement Learning
 - (CO) Evolutionary Algorithms
 - Fuzzy systems
 - Neural Networks

- è Adaptive systems in non-stationary environments (MAS)



- What are we going to talk about?



- What is Alife?
 - Large collection of descriptions about
 - What Alife currently is
 - Or what Alife should be
 - Questions?

Founder: C. Langton (1987 workshop: “Synthesis and simulation of biological systems”)

Summary = Computational Modeling of Living Systems

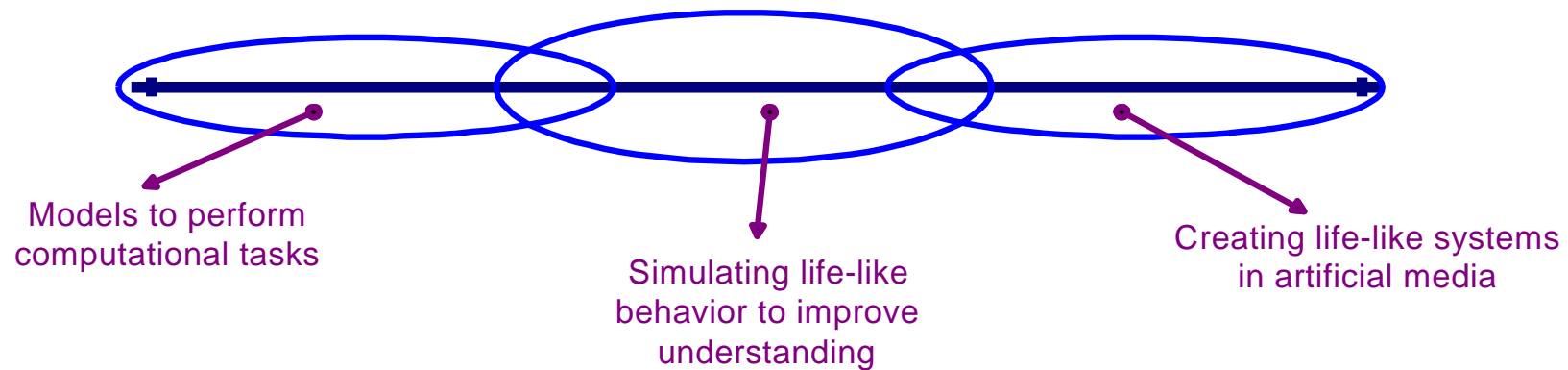
è To

1. Improve understanding of living systems
2. Build artificial models which perform particular tasks



- Model spectrum of Alife?

è Large interdisciplinary field with their own views on and interests in Alife.



è Debate on the future of Alife



- **Topics and applications;**(non-exhaustive)
 - Artificial Chemistry [Fontana, ...]
 - Cellular Automata [Forrest, Sipper, ...]
 - Evolutionary Dynamics [Maynard Smith, Kauffman...]
 - RNA Worlds [Ray, ...]
 - Animation industry [Simms, Near Life, ...]
 - Philosophy [Keeley, Dennett, Boden, ...]
 - Competitive behavior [Simms, Hillis, ...]
 - Artificial Evolution [Holland, Koza, Goldberg, ...]
 - Robotics [Brooks, Steels, ...]
 - Entertainment industry [Creatures, Evolva, ...]
 - Collective behavior [Swarm, Echo, ...]
 - Wetware [Taylor, Jefferson, ...]



- **Sources on Alife;** (non-exhaustive)

- **Books**

- C. G. Langton, editor, *Artificial Life an overview*, MIT Press, 1995.
- C. Adami, *Introduction to Artificial Life*, Springer-Verlag, 1998.
- M. Boden, editor, *The Philosophy of Artificial Life*, OUP, 1996
- Steven Levy, *Artificial Life*, Penguin Books, 1993

- **Proceedings**

- C. G. Langton, editor, *Artificial Life I-III (workshop proceedings)*, Addison Wesley (1989, 1991, 1993)
- R. A. Brooks and P. Maes, editors, *Artificial Life IV*, MIT Press, 1995
- C. Langton and T. Shimihara, editors, *Artificial Life V*, MIT Press, 1997
- C. Adami, R. Belew, H. Kitano and C. Taylor, editors, *Artificial Life VI*, MIT Press, 1998
- ... (ECAL proceedings), (Alife journals), ...



– Papers

- M. Sipper, An Introduction to Artificial Life, Explorations in Artificial Life, 1995
- M. Sipper, If the Milieu is Reasonable: Lessons from Nature on Creating Life, Journal of Transfigural Mathematics, Vol 3, No 1, 1997
- ...

– Web

- The Complexity and Artificial Research Concept for Self-Organizing Systems (<http://www.calresco.org/>)
- A philosophy of Artificial Life Bibliography (http://artsci.wustl.edu/~philos/pnp/alife/alife_bib.html)
- Artificial Life Online 2.0 (<http://alife.org/>) replaces Alife Online (<http://alife.santafe.edu/alife/>)
- Complex Adaptive Systems and Artificial Life (<http://islwww.epfl.ch/~moshes/caslinks.html>)
- Zooland (<http://alife.santafe.edu/~joke/zooland/>)

