Preliminaries for Distributed Natural Computing Inspired by the Slime Mold Physarum Polycephalum

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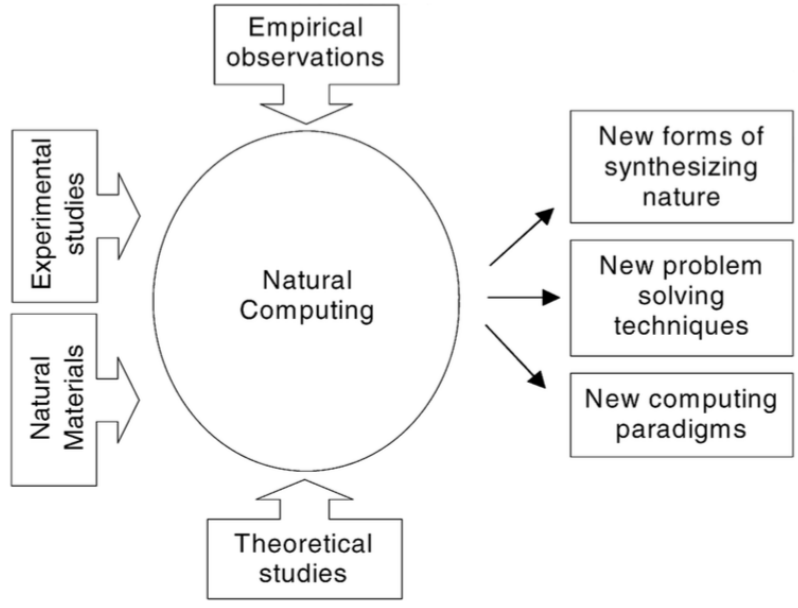
Natural Computing in a Nutshell

- Design of novel nature inspired algorithms.
- Synthesize natural phenomena by using computers.
- Use natural materials to do computations.



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Natural Computing is a highly interdisciplinary field!

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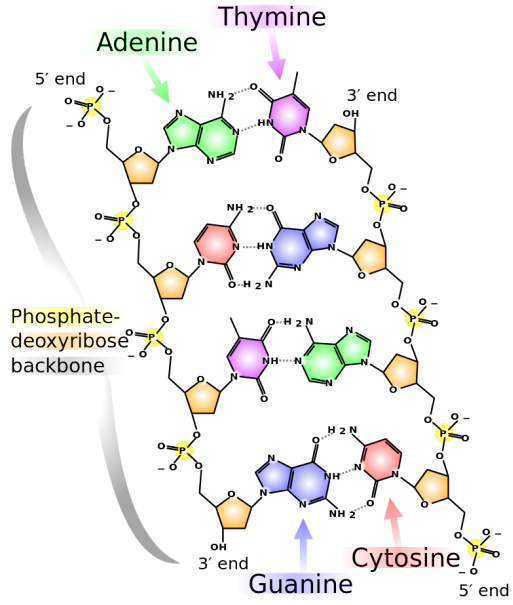

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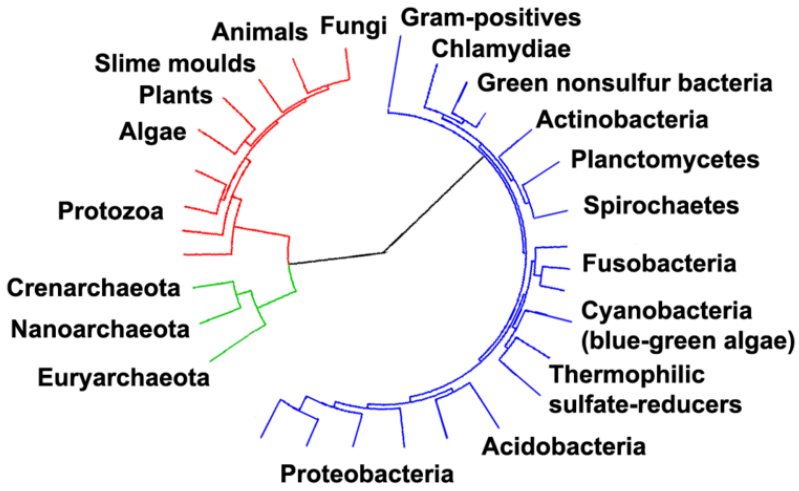
A Magnificent Mold

Physarum Polycephalum:

- Unicellular organism with many nuclei.
- Intricate foraging strategy.
- Networks distribute protoplasm.



Images courtesy of Prof. T. Ueda.

Key Experiments show:

Synchronisation, Maze Solving, Min/Max Behaviour

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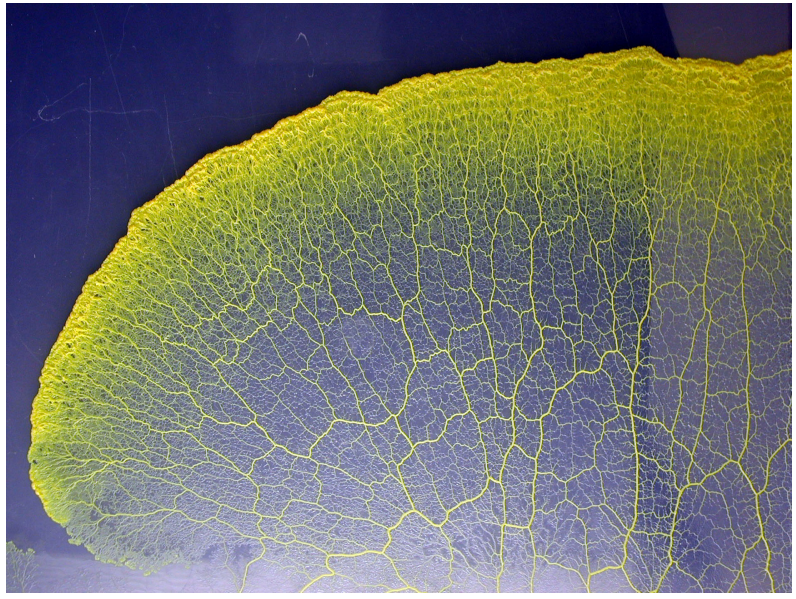

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Natural Computing with *P. polycephalum*

- Shortest path models
- Many body simulations, Voroni diagrams
- Light controlled of live Physarum (logic gates, transport network design)

Caveats:

Distributed nature of *P. polycephalum* and its networks has potential but is not sufficiently investigated.

Our approach:

Design and conduct experiments $\longrightarrow$ Network Extraction $\longrightarrow$ Network Analysis $\longrightarrow$ Network Modelling