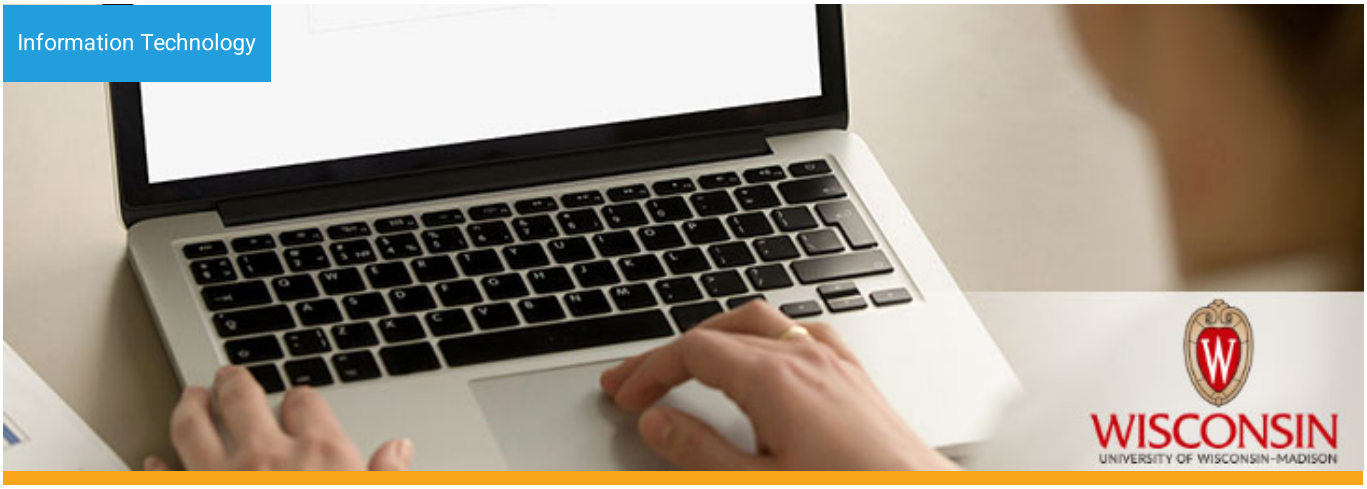
Information Technology



MOLECULAR COMPUTING METHODS AND SYSTEMS FOR SOLVING COMPUTATIONAL PROBLEMS

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The Invention

A collaborative group of professors from several universities, including UW-Madison, have developed a molecular computer for solving a computational problem using an array of reaction sites. The computation is performed by a network of chemical reactions taking place within an array of spatially localized droplets, each representing a bit of information. To solve combinatorial optimization problems, the constraints and requirements are mapped to interaction energies in a Hamiltonian (i.e., problem variables and parameters). The energies are in turn encoded in the form of intra- and inter-droplet interactions. The problem is solved by initiating the chemical reactions and allowing the system to reach a steady state; in effect, the spin system is annealed to its ground state. The solution is obtained by reading the final states of each droplet.

Key Benefits

- Novel molecular computing system for discrete optimization
- Removes need for physically defined circuits
- Intrinsic parallelization of chemicals reactions reduces step-wise memory storage needs
- Configurable with extensive phase, mechanism, and reagent space to explore
- Scalable

Additional Information

For More Information About the Inventors

- Randall Goldsmith

Tech Fields

- Information Technology : Computing methods, software & machine learning

For current licensing status, please contact Jennifer Gottwald at jennifer@warf.org or 608-960-9854