FUNDAMENTALS OF REVERSIBLE LOGIC AND COMPUTING
Euro-Micro Invited Paper/Tutorial by Marek Perkowski and Pawel Kerntopf
The goal of the invited paper/tutorial is to provide the
audience with some fundamental knowledge in reversible logic that would allow
them to start independent research.
1. Landauer's Principle and the fundamentals of Reversible Logic.
2. Feynman, Fredkin and Toffoli gates.
3. Multiple-valued reversible logic and gates (Picton's gates and circuits, our generalizations).
4. In the search of the best universal reversible gates.
5. Logic synthesis using reversible gates.
5.1. Cascades and work of Sasao/Kinoshita
5.2. Other regular structures and works of Picton, and our group
5.3. General Decomposition methods of synthesis
6. Realization technologies for reversible logic
6.1. CMOS
6.1.1. MIT - Younis and Knight, Vieri and Frank,
6.1.2. adiabatic switching at USC - Athas,
6.1.3. Korean group,
6.1.4. Japanese groups,
6.1.5. De Vos and European research
6.2. Optical realizations
6.3. Nano-mechanical
6.4. Quantum
7. Reversible computers and programming
7.1. Pendulum and other projects at MIT,
7.2. Athas and Svensson's microprocessor at USC,
7.3. Reversible FPGAs.
8. Future research and open problems.

All participants will obtain a booklet with lecture slides, additional slides
and complete literature list.