Reversible computation marks a promising new computing paradigm where, in contrast to conventional computation paradigms, all operations are performed in an invertible manner. This reversibility builds the basis for many emerging technologies that may replace or at least enhance conventional technologies. Examples include e.g. applications in the domain of quantum computation, which enables to solve many relevant problems significantly faster than conventional circuits and inherently is reversible,

- Low Power Computation, where the fact that no information is lost in reversible computation can be exploited,
- Adiabatic Circuits, a special low power technology where reversible circuits are particularly suited for,
- Encoding and Decoding Devices, which always realize one-to-one mappings and, thus, inherently follow a reversible computing paradigm, or
- Program Inversion, as programs based on a reversible computation paradigm would allow an inherent and obvious program inversion.

Besides that, applications in program debugging, testing, database recovery, discrete event simulation, reversible algorithms, reversible specification formalisms, reversible programming languages, process algebras, and the modeling of biochemical systems exist. First (physical) realizations following reversible computations paradigms exist e.g. as prototypical quantum circuits, CMOS-based reversible circuits, reversible energy recovery logic (RERL), or photonic circuits.

In a special issue of ACM's Journal on Emerging Technologies in Computing Systems (JETC), recent results and accomplishments in the areas mentioned above shall be collected. For this purpose, authors are invited to submit manuscripts with contributions to this field. Topics of interest include but are not limited to:

- Applications of Reversible Computation
- Reversible Architectures
- Hardware Realizations relying on Reversible Computations
- Physical Realizations of Reversible Circuits
- Reversible Programming Languages
- Reversible Algorithms
- Reversible Software
- Theoretical Results in Reversible Computation
- Design of Reversible Circuits
- Synthesis of Reversible Circuits
- Testing and Verification of Reversible Computations
- Debugging using Reversibility
- Fault Tolerance and Error Correction of Reversible Computations
- Quantum Computation

For manuscript submission visit: http://jetc.acm.org/