High-Level Modeling
The General Algebraic Modeling System (GAMS) is a high-level modeling system for mathematical programming problems. GAMS is tailored for complex, large-scale modeling applications, and allows you to build large maintainable models that can be adapted quickly to new situations. Models are fully portable from one computer platform to another.

State-of-the-Art Solvers
GAMS incorporates all major commercial and academic state-of-the-art solution technologies for a broad range of problem types.

Integer Optimization for Identification of Drug Effects
Understanding the mechanisms of cell function is a major challenge for the scientific community and a cornerstone for drug development. An interdisciplinary team at the National Technical University Athens and the Massachusetts Institute of Technology developed a methodology integrating high-throughput experiments with state-of-the-art combinatorial optimization, building on existing boolean models of signaling pathways.

- Phosphoproteomic experiments are performed in normal and cancer liver cells with and without the influence of drugs.
- The signaling pathways in each case are identified by an integer linear programming formulation.
- The computational time is orders of magnitude faster than previous approaches allowing for larger pathways and data sets.
- Known and unknown drug effects (shown in red) are identified by comparing the two networks.

For more information about this application please contact Alexander Mitsos <mitsos@mit.edu> or visit: http://www.bio-itworld.com/2010/issues/jul-aug/RND.html