



March 2002 update for GSRC

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Outline

★ Recent work

- ★ Bookshelf.exe (BX)
- ★ Integration for Physical Design
- ★ Calibrating Achievable Design via SAT

★ Future work

- ★ Bookshelf.exe (BX)
- ★ Integration for Physical Design
- ★ Calibrating Achievable Design via SAT

Recent Work: Bookshelf.exe

- ✦ Executable extensions of the bookshelf
 - ✦ got off the ground
 - ✦ two undergrads working on the project
 - ✦ architecture mapped out (10-page doc)
 - ✦ parts of networking back-end implemented
 - ✦ front-end and first demo on the way

Recent Work: PD Integration

- ✦ Integration of floorplanning techniques into large-scale placement engines
- ✦ New flow
 - ✦ shred macros → place cells → cluster cells → floorplan clusters + macros → place cells
 - ✦ ISPD 2002 paper on consistent placement of macros and standard cells
 - ✦ uses results from our ICCD 2001 paper on fixed-outline floorplanning

Recent Work: C.A.D. via SAT

- ★ SAT-based routing **can give definitive negative answers**
- ★ DAC 2002 paper (w Sakallah) speeds up SAT solvers on routing-derived SAT instances
 - ★ also improves standard routing formulations
 - ★ idea: extract structure (symmetry) + use it explicitly
- ★ SAT Symposium 2002 paper (w Sakallah)
 - ★ extends classical Davis-Putnam techniques to 0-1 ILPs and demos routing applications

Future Work: Bookshelf.exe

- ✦ Front-end and first demo on the way
- ✦ First set of functionalities
 - ✦ load N solvers (some in source code, some in binaries) and K benchmarks
 - ✦ distribute all-pair runs over several workstations
 - ✦ automatically collect results
 - ✦ report on the Web and via email
 - ✦ add one more solver and/or one more benchmark
 - ✦ schedule additional runs; collect and report results
- ✦ **Demo goals**
 - ✦ **quickly and automatically evaluate new solvers**
 - ✦ **show sharable infrastructure**

Future Work: PD Integration

- ✦ Better comparisons of our flows with commercial tools
 - ✦ current comparisons encouraging but incomplete
 - ✦ need to consider routing congestion, not just half-perimeter wire-length
- ✦ Prepare journal versions of conf. papers

Future Work: C.A.D. via SAT

- ★ Recall: SAT-based routing **can give definitive negative answers**
- ★ Further studies of structure in PD-derived SAT instances
 - *faster* symmetry detection, possibly by missing some symmetries (i.e., opportunistic symmetry detection)
- ★ When ***all*** constraints cannot be satisfied, ***satisfy as many as possible***
 - MaxSAT: prelim results in our SAT 2002 paper
- ★ Further studies of 0-1 ILPs
 - try beating CPLEX w pseudo-Boolean techniques