Applications of patchwork dynamics for glassy systems
CREIGHTON THOMAS, ALAN MIDDLETON, Syracuse University, OLIVIA
WHITE, MIT — We present work on "patchwork dynamics" as a technique for
studying the nonequilibrium properties of glassy systems. In patchwork dynamics,
we replace local Monte Carlo simulations, which require exponentially long times to
equilibrate at a given length scale, with exact equilibration on patches at a given
length scale, which can be done rapidly in models such as the 2D Ising spin glass and
disordered dimer models. We have demonstrated some interesting applications of
patchwork dynamics to such systems: 1) as a heuristic ground state algorithm for the
2D Ising spin glass on a torus (for which there are no known fast exact algorithms)
and the 3D Ising spin glass; 2) as a method to study aging effects, persistence, and
memory in 2D and 3D Ising spin glasses; 3) as a sampling procedure to study the
nonequilibrium properties of disordered dimer models at finite temperatures.

Creighton Thomas
Syracuse University