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**William G Kolata\*** (kolata@siam.org), SIAM, 3600 Market Street, 6th Floor, Philadelphia, PA 19104-2688, and **Stefan Kolata**. *Random Search with Memory*.

This work was motivated by an attempt to model performance on a standard test of spatial working memory, the radial arm maze. To date, there have been no quantitative methods for estimating working memory capacity from error performance in the radial arm maze. An "error" is a visit to a previously visited arm.

We present a model based on uniform random search and the assumption of a fixed memory capacity. We derive explicit expressions for two probability densities: the probability of  $e$  errors when all arms of the maze have been visited and the probability of  $e$  errors among the first  $m$  choices, where  $m$  is the number of arms in the maze. We also derive expressions for the mean and second moment in the first case. We show in both cases that performance depends on the difference  $q = m - c$ , where  $c$  is memory capacity. We also show that estimates of memory capacity are robust with regard to many non-uniform but random search patterns. (Received June 21, 2007)