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Ermelinda Delavina and **Craig Eric Larson*** (clarson@vcu.edu), 4106 Grace E. Harris Hall, 1015 Floyd Avenue, Richmond, VA 23284-2014. *A Parallel Algorithm for finding Maximum Critical Independent Sets in Graphs.*

An independent set of vertices I_c in a graph is a critical independent set if $|I_v| - |N(I_c)| \geq |J| - |N(J)|$, for any independent set J . A maximum critical independent set (MCIS) is a critical independent set on maximum cardinality. Maximum critical independent sets have been shown to be of both practical and theoretical interest. The published algorithm has a running time of $O(\sqrt{nen})$. Determining whether a vertex v is in *some* MCIS can be determined without finding an MCIS containing v . Thus, the vertices can be tested in parallel. This is the main step in a new algorithm for finding a MCIS with a running time of $O(\sqrt{ne})$. The algorithm also yields the set C of all vertices in an MCIS, and we discuss properties of this set. (Received September 22, 2009)