1077-55-2465 **Nathaniel Rounds*** (nrounds@indiana.edu). *What is the algebraic structure of topological manifolds?* Preliminary report.

Can we associate an algebraic structure to a manifold such that this structure up to equivalence determines the manifold up to homeomorphism? If we replace the word "homeomorphism" with the word "homotopy equivalence", the answer is yes. We will describe various algebraic structures on a manifold's chains and cochains, all of which are known to be homotopy invariant. We will suggest, however, that the missing idea is that of algebraic locality. The various algebraic structures that we associate to a manifold are all local in an appropriate sense, but the inverse to the Poincaré duality map need not be local. We will show, using Ranicki's algebraic surgery, that considering the inverse to the Poincaré duality map leads to a topological invariant of manifolds. We will end with a (still partially conjectural) synthesis of all these ideas which gives an affirmative answer to the opening question. (Received September 22, 2011)