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**Eduardo Cabral Balreira\***, 255 Hurley Hall, Notre Dame, IN 46556. *Characterizing  
Diffeomorphisms by the Topology of the Pullback of Hyperplane Foliations.*

Our main theorem states that a local diffeomorphism  $f : \mathbb{R}^n \rightarrow \mathbb{R}^n$  is bijective if and only if the pre-image of every affine hyperplane is non-empty and acyclic (i.e., it has the homology of a point). The proof is based on some geometric constructions involving foliations and tools from intersection theory. This result generalizes in finite dimension the classical Hadamard-Plastock theorem, including its recent improvement by Nollet-Xavier. We also present natural analytical conditions which imply our topological hypotheses. (Received February 06, 2006)