The goal of this study is to test the behavior of a fiber threaded into a flexible cylinder using axial force. The motivation for the study is to conduct a broad empirical, numerical investigation to find solutions for preventing damage/injury to a fiber in the wall of a flexible cylinder such as in the case of blood vessels, tissues, and similar engineering applications (deep drilling, etc.) Achievements resulting from this project would be: a comprehensive empirical investigation of the behavior of the fiber and the flexible cylinder, finite element simulations, comparisons with the literature, and adaptation to a dimensionless basic analytical model that may best help achieve the objective of this work. In the case of a fiber within a flexible cylinder, we expect to see two types of deformation of the external cylinder: Type 1 "Local" deformation, which causes changes in the shape of the cross-section in the area in which the fiber makes contact with the cylinder, and Type 2 "Global" deformation -- a global change in the shape of the tube (cylinder), specifically: the axis of the tube that was straight becomes crooked. To date, no work has been published regarding a flexible cylinder, except for one [46] -- in which a limit case was studied, where only Type 1 deformation was involved. Specifically, the assumption there was that the cylinder was actually a two-dimensional elastic platform and not a three-dimensional one. In other words, when the fiber makes contact with the cylinder, the cylinder exerts reflective force in the area of contact that is proportional to the extent of "penetration" of the fiber beyond the surface of the cylinder. This is of course an unrealistic case, as the cylinder is not treated as a real elastic structure/body. That is, there is no effect/coupling between the radial sliding only at point A and the sliding at point B, even if it is very close to it. However, this is a good limit case in the sense that it enables significant simplification of the analysis, focusing only on Type 1 (local) deformation. Another important point is that [46] carries out only numerical analysis (no finite elements, but rather the solution of a set of nonlinear differential equations). In addition, [46] has no element of experiment. In view of the great complexity of the general problem of a fiber within a flexible cylinder, we would also like to execute a "small step," one that would enable analysis of a problem that is a littler simpler than the most general case, but still allows for insights. Based on these insights, we would then be able to continue on to more general and complex cases. Therefore, for our study, we have selected a "reverse" limit case from that of [46]. We will examine the case in which only Type 2 deformation occurs, i.e. global deformation of the tube, while any local deformation is negligible. This is actually the case in which the circumferential/tangential stiffness of the cylinder is very large in relation to the lengthwise stiffness. This means that these cylinders do not allow a local change of shape/size of the cross-section, but do enable global deformations of the tube (the tube changes from straight to crooked). For the experiments, we use non-standard tubes, which are actually commonly used for cladding/protection of another tube that is inserted into them. The tubes to be used are made of polymeric material, but a thin rigid fiber (of metal or other rigid material) passes helically in their circumference. See Figure 1. In terms of simulations of finite elements -- to create a model of the cylinder, we use a composite material that is very rigid in the circumferential direction. Another benefit of taking on this problem (there are only global deformations), is that it is highly likely that a relatively simple mathematical model can be sketched, which may even allow analytical insights, at least regarding the first deformations. Specifically, the cylinder can be modeled as a beam. The fiber that is inside makes contact in its center and exerts force on it. This results in deformation in the cylinder (like a beam that exerts force on it in the middle of the opening). It is possible to try to reach even the conditions of moving to a configuration of contact in a line, etc. Another practical advantage of performing experiments with the tubes described above is the fact that they can be obtained without initial curvature--unlike other flexible tubes that usually come with uniform initial curvature (rolled up) -- see Figure 2. Another important point, the numerical study in this case is not for the purpose of confirming the experiments. It is rather an inseparable part of the investigation: the process involves performing experiments. From these experiments, we can derive graphs of force versus shortening, and also information regarding the response of the cylinder. Contrary to experiments with a rigid cylinder, we cannot gather information regarding the behavior of the fiber inside. To obtain understanding of the behavior of the fiber, we use finite element simulations. In the first stage, we want to make sure that the response we receive indeed corresponds to the one we measured in the experiments with respect to the force-shortening graph and the response of the external tube. Once it seems that there is correspondence (such that we can say that the simulations indeed model the behavior very well), we can complete the picture of the experiment. Using the simulations, we can represent the behavior of the fiber within the tube: where there is contact, what type of contact (point, linear, planar or three-dimensional deformation, etc.). This research project is original in that there is no known publication/project that has dealt with the investigation of the combined behavior of a fiber within a flexible cylinder, except for [46], which only involved numerical research, based on assumptions that significantly simplified the subject, i.e. it involved only local deformation with no coupling. Our work is expected to be innovative in several ways: it is the first systematic empirical investigation, the first time there is treatment of global deformation of the cylinder, and the first time there is a combination of experiments, finite element simulations, and a simple analytical model, which enables the creation of a complete picture of the behavior of a fiber inside a flexible cylinder, the response of the flexible cylinder, and the interaction between them.