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Title: Spinal open books and symplectic fillings of contact 3-manifolds

Abstract: We consider in this talk the following natural question in contact topology: how many different ways can a given contact manifold arise as the convex boundary of a compact symplectic manifold (i.e. a symplectic filling)? One way to attack this question is by considering certain geometric decompositions that reduce the dimension of the problem, e.g. a Lefschetz fibration on a symplectic 4-manifold presents it as a 2-parameter family of symplectically embedded surfaces, which can then be turned into J-holomorphic curves. The natural structure arising on the boundary of a 4-manifold with a Lefschetz fibration is called a spinal open book. In a joint paper with Sam Lisi and Jeremy Van Horn-Morris, we proved that for "most" contact 3-manifolds admitting spinal open books with genus zero pages, all possible symplectic fillings come from Lefschetz fibrations whose fibers are J-holomorphic curves, including finitely many nodal curves (Lefschetz singular fibers). In this talk, I will sketch the geometric construction and analytical machinery that leads to this result, give a few examples of contact manifolds whose fillings can be classified as a corollary, and also discuss the following caveat: for more complicated spinal open books, the holomorphic curves one obtains on the filling can also include finitely many so-called "exotic fibers", a new type of degeneration that cannot be described in the language of Lefschetz fibrations.