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**Joseph A Johns\*** ([johns@math.uchicago.edu](mailto:johns@math.uchicago.edu)), 5734 S.University Ave, Chicago, IL 60637.

*From Morse functions to Lefschetz fibrations, and related invariants.*

Let  $f$  be a Morse function on a smooth compact manifold  $N$  together with a Riemannian metric  $g$  such that  $(f, g)$  is a Morse-Smale pair. Given this data, we explain how to construct an explicit model of a Lefschetz fibration  $\pi : T^*N \longrightarrow \mathbb{C}$  which extends  $f$  and has no further critical points. If time permits, we will sketch how to relate the associated flow category of  $(f, g)$  to the directed Fukaya category of  $\pi$ , and mention some applications to Arnold's "nearby Lagrangian problem", due to Seidel, building on work of Fukaya and Smith. (Received September 23, 2005)