1153-18-31 **David I Spivak*** (dspivak@mit.edu), 77 Massachusetts Ave., Department of Mathematics, Cambridge, MA 02139. *Fibrations as generalized lens categories.*

Lenses (also called bimorphic lenses) have recently received a great deal of attention from applied category theorists. One reason is that lenses show up in many disparate places, such as database updates, learning algorithms, open games, open discrete dynamical systems, and wiring diagrams. Lenses have recently been beautifully generalized by Mitchell Riley to so-called profunctor optics.

In this talk we'll discuss a different direction of generalization. Namely for every category C and functor F: $C^{op} \to$ Cat, we define a category Lens_F using the Grothendieck construction; the result is a fibration over C. The idea is that a morphism in the Grothendieck construction consists of two parts, which turn out to be the "get" and "put" maps from lens theory.

The idea of using opfibrations to formalize lenses has been present in the literature for some time; e.g. Johnson et al. consider an opfibration as a sort of nicely-behaved lens. This is fairly orthogonal to what we do here, where we think of (the total space of) a fibration as a generalized *category* of lenses.

We give some several examples and constructions in the above context, e.g. open dynamical systems (both discrete and continuous); we do not assume familiarity with lenses or fibrations. (Received August 04, 2019)