1153-18-420 **Oscar I Hernandez** (ohernandez13@simons-rock.edu), Spark Tank, 3516 9th Street, Riverside, CA 92501, and **Rany R Tith*** (ranyti@ucr.edu), Department of Mathematics, University of California, Riverside, Riverside, CA 92521. *Towards Compositional Transfer Learning.* Preliminary report.

Consider two supervised learning algorithms which search over sets of functions $A \to B$ parametrized by spaces P, Q to find the best approximations to some ideal functions $f, g : A \to B$. A supervised transfer learning algorithm is a meta learning algorithm which searches over a set of functions $B^A \to B^A$ parametrized by a space Q to find the best approximation to some ideal function $\alpha : B^A \to B^A$.

We endow additional structure to the 2-cells in the weak 2-category `Learn` of open learners between sets [Fong, Spivak, Tuyéras] in order to construct a full and faithful symmetric monoidal functor to it from the category $\texttt{Learn}(A, B)$ of transfer learners between open learners from A to B. We show by induction that `Learn` is a symmetric monoidal weak n-category admitting bimonoids, which yields a canonical equivalence between open learners and *higher* transfer learners. This provides a structural perspective on meta learning, and hints at a *higher* approach to lenses, open games, and other structures which model the exchange of information. (Received September 04, 2019)