## **AMÉLIE COMTOIS**, University of Ottawa Weighted Limits in V-Graded Categories

Categories graded by a monoidal category  $\mathcal{V}$  generalize both  $\mathcal{V}$ -actegories and  $\mathcal{V}$ -enriched categories without requiring any additional properties of  $\mathcal{V}$ . However,  $\mathcal{V}$ -graded categories are themselves also categories enriched in a monoidal category  $\hat{\mathcal{V}}$  whose objects are presheaves on  $\mathcal{V}$ . In this talk, we define a notion of weighted limit for  $\mathcal{V}$ -graded categories that specializes to recover the familiar notion of weighted limit for enriched categories. Our  $\mathcal{V}$ -graded weighted limits involve weights valued in  $\mathcal{V}$  rather than  $\hat{\mathcal{V}}$ , and they form a special class of  $\hat{\mathcal{V}}$ -enriched weighted limits. This allows us to prove that in the special case where  $\mathcal{V}$  is biclosed and the  $\mathcal{V}$ -graded categories involved are  $\mathcal{V}$ -enriched, we recover precisely the familiar notion of weighted limit for  $\mathcal{V}$ -enriched categories, and they also give rise to a notion of weighted limit in  $\mathcal{V}$ -actegories that admits a particularly simple description. For arbitrary  $\mathcal{V}$ -graded categories, we develop both a convenient concrete formulation of weighted limits as well as an equivalent abstract description as certain  $\mathcal{V}$ -graded representations, and we explore examples of  $\mathcal{V}$ -graded weighted limits including  $\mathcal{V}$ -graded powers, conical limits, and weighted pullbacks. This is joint work with Rick Blute and Rory Lucyshyn-Wright.