



# Applied Topology in Albany (ATiA) Seminar

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SAECULAR PERSISTENCE

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ABSTRACT. The decomposition of persistence modules into simple parts or “bars” is basic to topological data analysis. However, such breakdowns exist only for persistence modules derived from homology with field coefficients. This leaves a structural gap between persistence and the wider field of homological algebra. Recently, Patel narrowed the gap by defining barcodes for tame persistence modules in categories outside Vect. In a departure from the linear regime, however, such barcodes do not accompany an algebraic decomposition of the module itself—there is no notion of a “cycle representative” for one of these bars. We present the missing link: a new decomposition scheme that extends the notion of “factorization into bars” from the linear regime to any abelian category (as well as many non-abelian categories). Time permitting, we will discuss applications in theory, computation, and visualization.