Leavitt path algebras
(Something for everyone: graphs, rings, and C*-algebras)

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Most of the rings one encounters as basic examples have what's known as the "Invariant Basis Number" property, namely, for every pair of positive integers m and n, if the free left R-modules ${}_R R^{(m)}$ and ${}_R R^{(n)}$ are isomorphic, then $m = n$. There are, however, large classes of naturally occurring rings which do not have this property. While at first glance such rings might seem pathological, in fact they arise quite naturally in a number of contexts (e.g. as endomorphism rings of infinite dimensional vector spaces), and possess a significant (perhaps surprising) amount of structure. We describe a class of such rings, the (now-classical) *Leavitt algebras*, and then describe their recently developed generalizations, the *Leavitt path algebras*. One of the nice aspects of this subject is that pictorial representations (using graphs) of the algebras are readily available. Indeed, many of the results in this subject depend on rather intriguing graph-theoretic concepts. In addition, there are strong connections between these algebraic structures and a class of C*-algebras (the *graph C*-algebras*), a connection which is currently the subject of great interest to both algebraists and analysts. This talk should be accessible to everyone, and have something for everyone.