

A Whale of a Catch, but Moby Dick still swims free ...

Gene Abrams
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There is a longstanding, still-unresolved statement about Leavitt path algebras, commonly known as the Algebraic Kirchberg Phillips Question. Behind closed doors, some of us refer to it as *The Big Fish Question*, or, more succinctly, *Moby Dick*.

In 2008, along with P.N. Anh (Math Institute, Hungarian Academy of Sciences) and Enrique Pardo (U. Cádiz, Spain), we were able to capture one of Moby's smaller cousins, *The Medium Fish*. Specifically, we were able to give necessary and sufficient conditions so that various-sized matrix rings over an important class of algebras (the *Leavitt algebras*) are isomorphic. During the journey we discovered an elegantly simple but extremely powerful number-theoretic process which proved to be exactly the fishing tackle we needed to reel in the Medium Fish.

In this talk I'll give the details of the Medium Fish question, describe the number-theoretic result, and show how the Medium Fish question was resolved. I'll then present a truly remarkable consequence of our construction (discovered by Enrique Pardo), namely, the resolution of a three-decades-old question in the theory of simple groups.

Finally, I'll share how 24 hours of my own recent mathematical angst led to a satisfying and productive discussion with my UCCS colleagues Zak Mesyan and Greg Oman.

**The entire talk should be completely accessible to anyone who has seen a first course in modern algebra. Indeed, much of the talk should be accessible to anyone who has read this abstract. And, for those of you who can attend the presentation in person, the pre-talk refreshments will be worth the trip to UCCS.*