Research Manifesto

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My research tends to be of a pedagogical nature—that is, I am less interested in extending the boundaries of knowledge than in clarifying things which are already known. Of course, it is often necessary to prove new theorems in the pursuit of this goal—for example, that an old definition is equivalent to some new, sleeker definition. On the other hand, it can equally well involve rediscovering and publicising facts which, though known, are not well-known. Needless to say, this form of research is frequently derided as a form of advanced navel gazing; but I think that it can play an important role in the transmission of mathematical knowledge from age to age, as well as accelerating the process by which applied mathematicians adopt new results from the world of pure mathematics.

A significant proportion of my energy has been devoted to the comparatively recent theory of *operator spaces* and *linear complete contractions*, []. This is touted by its proponents within the analysis community as defining a *non-commutative functional analysis*, and seems to provide a firmer foundation for operator algebra than the more conventional theory of Banach spaces and linear contractions. One strand of my research in this area is to resolve the conjecture (of V. Pestov) that operator spaces are actually Banach spaces internal to some Grothendieck topos; a second is to extend the classification of (non-self-adjoint) operator algebras as monoids with respect to the Haagerup tensor product of operator spaces to the self-adjoint case. My interests in functional analysis also encompass (commutative and non-commutative) measure theory.

Most of my published material is composed of fairly banal, but nonetheless new, observations either about the general theory of $*$-autonomous (and related) categories or about the particular $*$-autonomous category of complete lattices and supremum-preserving maps. The latter is crucial to quantale theory, which purports to provide a pointless analogue to non-commutative topology, and which, it is hoped, may eventually lead to a non-commutative version of topos theory. Past research has also included the study of Quillen model structures on $*$-autonomous categories, with a view to better understanding the dichotomy between the denotational semantics of linear logic and Girard's Geometry of Interaction approach. I do not honestly consider these to have been particularly fruitful.

I am always open to new research directions. I actively participate in colloquia, as well as seminars not directly related to category theory, in order to not succumb to dogmatic slumbers.