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Berwick Prize 2019
Citation for Dr Clark Barwick

The Berwick Prize is awarded to Dr Clark Barwick of the University of Edinburgh, for his paper On the algebraic K-theory of higher categories, published in the Journal of Topology in 2016, which proves that Waldhausen's algebraic K-theory is the universal homology theory for ∞-categories, and uses this universality to reprove the major fundamental theorems of the subject in this new context.

The proofs in this paper are entirely novel: Barwick characterises the additivity property enjoyed by K-theory as a kind of 'categorified excision' criterion. Thus what Barwick is really showing is that algebraic K-theory is the natural categorification of stable homotopy theory. This perspective allows him to identify K-theory as the derivative, in the sense of the functor calculus of Goodwillie, of a forgetful functor. This identification is powerful: the four fundamental theorems of K-theory — the Additivity Theorem, the Approximation Theorem, the Fibration Theorem, and the Cofinality Theorem — are proved in this paper as relatively simple corollaries of generalities about the calculus of functors along with some observations about the homotopy theory of higher categories. With all this in hand, Barwick is able to generalise the Thomason-Trobaugh 'Proto-localisation Theorem' to the contexts of E_1 algebras and spectral stacks.

This approach to K-theory is a launching pad for the enterprise of algebraic K-theory as a higher categorical invariant. The results of this paper have been employed in a number of ways, by Barwick himself and his co-authors and by others, including the Multiplicativity Theorem for K-theory, a generalised Equivariant Barratt–Priddy–Quillen, the Theorem of the Heart, which has recently given rise to a powerful obstruction to the existence of t-structures in the work of Antieau, Gepner, and Heller, and a construction of a 'real equivariant' form of algebraic K-theory.