Contramodules for corings
(joint work with Tomasz Brzeziński)

If a monad L on a category $\mathcal{M}$ possesses a right adjoint R, then R is a comonad. Algebras for the monad L, and coalgebras for the comonad R, constitute isomorphic categories, hence they give equivalent viewpoints. For example, for an algebra A over a commutative ring, both categories of algebras for the monad $(\bullet)\otimes A$, and coalgebras for its right adjoint $\mathrm{Hom}(A, \bullet)$, are isomorphic to the category of right A-modules.

Dually, if a comonad L' possesses a right adjoint R', then R' is a monad. However, in this case coalgebras for one are not directly related to algebras for the other. If C is a coring, coalgebras for the comonad $(\bullet) \otimes C$ are known as C-*comodules* and they have been extensively studied. Algebras for its right adjoint $\mathrm{Hom}(C, \bullet)$ are called C-*contramodules* and the aim of this talk is to survey their properties and compare them with comodules.