The notion of a disintegration of positive measures can be formulated diagrammatically in a category of transition kernels. Combining this with the functor relating transition kernels and positive operators, a notion of non-commutative disintegration can be made for certain C*-algebras and von Neumann algebras in terms of positive operators. While a certain degree of uniqueness holds as in the classical measure-theoretic case, existence of such disintegrations is not guaranteed even on finite-dimensional matrix algebras. Such disintegrations are closely related to reversible processes in quantum information theory and conditional probabilities in non-commutative probability. This is joint work with Benjamin P. Russo (Farmingdale State College SUNY). (Received September 10, 2018)