We introduce a family of sequence transformations defined by means of partial Bell polynomials. With appropriate choices of parameters, our family includes known transformations like INVERT, CONV, and EXP, as well as possibly unexplored sequence transformations that lead to a variety of new (not listed in OEIS) integer sequences. We use properties of the partial Bell polynomials to prove inverse relations and some recurrence formulas. (Received August 14, 2014)