Colouring Block Designs

A block design with point set V and block set $\mathcal{B}$ is said to be c-colourable if the points of V can be partitioned into c sets called colour classes such that no block of $\mathcal{B}$ has all of its points in a single colour class. A design is said to be c-chromatic if it is c-colourable but not $(c-1)$-colourable. For all integers $c \geq 2$, $k \geq 6$ and $\lambda \geq 1$, we show that for sufficiently large v the obvious necessary conditions for the existence of a BIBD(v, k, λ) are sufficient for the existence of a c-chromatic BIBD(v, k, λ).

This is joint work with Daniel Horsley.