$^{39}$K Bose-Einstein condensates in two and three dimensions with tuneable interactions ROBERT CAMPBELL, ROBERT SMITH, NAAMAN TAMMUZ, SCOTT BEATTIE, STUART MOULDER, ZORAN HADZIBABIC, University of Cambridge, UK — We report on the production of $^{39}$K Bose-Einstein condensates of over $4 \times 10^5$ atoms with broadly tuneable interactions [Campbell et al., Phys. Rev. A 82, 063611 (2010)]. Condensation is achieved via a combination of sympathetic cooling with $^{87}$Rb in a QUIC magnetic trap and direct evaporation in a large-volume crossed optical dipole trap, where we exploit the broad Feshbach resonance at 402.5 G to tune the $^{39}$K interactions from weak and attractive to strong and repulsive. We also discuss the progress of our experimental investigation into the role of interactions on the low temperature behaviour of two-dimensional Bose gases.