# FiNZ 2015 Abstract: Development of a cost-efficient method for micro-scale heat transfer and temperature studies

Thermo-chromatic liquid crystals (TLCs) are chiral molecules that reflect specific wavelengths of visible light. The wavelength reflected is proportional to the temperature of the TLCs. The goal of this study was to develop experimental methods involving TLCs to be used on the micro scale at low financial cost. A microscope was built utilising a cell phone camera and a lens from a laser pointer to provide magnification shown to be 100$×$-200$×$. The capabilities of TLC was conducted at the University of Canterbury by collecting image data of TLC coated surfaces with a cellphone and then post processing the images in MATLAB to produce temperature maps based on collected colour data. Studies conducted show thermal gradients >104 Km-1 can be captured and that the entire colour range could be utilised for studying electroporation. Future research developments use the method to study microfluidics along with existing applications. Beyond research studies, it is also applicable as an educational tool due to its accessibility and the low financial capital required.