1116-05-2242 **Po-Shen Loh*** (ploh@cmu.edu), Wean 6113, Dept of Math Sciences, Carnegie Mellon University, Pittsburgh, PA 15213. *Directed paths: from Ramsey to Ruzsa and Szemerédi.*

Starting from an innocent Ramsey-theoretic question regarding directed paths in tournaments, we discover a series of rich and surprising connections that lead into the theory around a fundamental problem in Combinatorics: the Ruzsa-Szemerédi induced matching problem. Using these relationships, we prove that every coloring of the edges of the transitive n-vertex tournament using three colors contains a directed path of length at least $\sqrt{n}e^{\log^* n}$ which entirely avoids some color. We also completely resolve the analogous question for ordinary monochromatic directed paths in general tournaments, as well as natural generalizations of the Ruzsa-Szemerédi problem which we encounter through our investigation. (Received September 22, 2015)