Functional Magnetic Resonance Imaging (fMRI), the most important tool used for studying human brain function, actually measures changes in blood flow and oxygenation and not neural activity in the brain (as commonly thought). The key assumption - though untested - is that blood flow is triggered by local neural activity and is thus a reliable measure of that activity. We showed that this assumption does not always hold true. We demonstrated that blood flows to relevant brain areas in anticipation of a task, even before there is any local neural activity in those brain areas. My RISE award funded my work during the crucial initial stages of the project of exploring the basic phenomenon and describing these findings.