CULTURE BP-NE 0517						
RIF PROPOSAL NUMBER	TITLE	COORDINATOR	HOST ORGANIZATION	PROJECT BUDGET	RIF FUNDING	PUBLISHABLE SUMMARY
ΚΟΥΛΤΟΥΡΑ/BP-NE/0517/01	Different Functional Neural Substrates for Good and Poor Language Outcome in Autism	Michael Lombardo	University of Cyprus	35,000.00 €	35,000.00 €	Autism spectrum disorder (ASD) is a clinical diagnostic label given to individuals with early developmental difficulties in reciprocal social interaction and communication, and increased repetitive stereotyped behaviors and/or restricted interests. While diagnosis implies some degree of similarity in behavior across patients, the label of ASD masks a high degree of heterogeneity regarding how patients differ. Importantly, patients with the same ASD diagnosis may differ dramatically in terms of the underlying biological mechanisms of importance and with regards to very different clinical outcomes. To better understand the causes and help identify ways of effectively treating ASD, we need to move beyond the behavioral similarities between patients and understand important dimensions of heterogeneity within the ASD population. One particular dimension of heterogeneity that could point to differing biology and clinical outcomes is early language development. By the end of the first 4-5 years of life, some ASD individuals develop fluent language ability that is indistinguishable from non-ASD individuals, while other ASD individuals remain minimally verbal. This distinction regarding very different early language development points to different underlying neurobiology (Lombardo et al., 2015) and has impact for predicting different clinical outcomes later in life. In this project we extend this work to examine how dynamic intrinsic functional brain organization (e.g., dynamic functional connectivity) may be different in ASD subtypes with different early language development. Using sliding-window dynamic functional connectivity analysis and signal complexity measures on resting state fMRI and EEG data, we will examine if dynamic measures differentiate toddlers with good versus poor early language development. If dynamic functional changes are indeed biomarkers that heavily differentiate ASD early language outcome subtypes, we will then further test whether such biomarkers can help predict behavioral responses to early intervention treatment.The impact of identifying such biomarkers would be substantial since there are few high-impact biomarkers that differentiate ASD subtypes and have clinical importance for predicting treatment outcome. Theoretically this work could also help us further our knowledge about how early language outcome may be linked to aberrant neural circuit dynamics and thereby later poorer clinical outcome.
ΚΟΥΛΤΟΥΡΑ/BP-NE/0517/14	Intelligent Transportation Systems in the era of Connected Vehicles	Stelios Timotheou	University of Cyprus	35,000.00 €	35,000.00 €	Transportation is one of the cornerstones of human civilization which facilitates the movement of people and goods from one location to another. People routinely use several transportation modes, such as road, air, rail and water for their everyday activities. However, the continuous global population increase and urbanization around the globe is pushing transportation systems to their limits. Unquestionably, the road transportation system is the one mostly affected because it is difficult and costly to increase the capacity of existing infrastructure by building new or expanding existing roads, especially in urban areas. An alternative approach is to increase the capacity of existing infrastructure through the integration of emerging technologies. The emergence of electronic, sensing, positioning and information technologies in road transport, termed Intelligent Transportation Systems (ITS), has allowed safer cruising, faster navigation and has enabled vehicles to act as mobile traffic sensors. The next frontier in ITS is the transformation of road transport into a fully connected world through the incorporation of wireless communications into every transportation actor such as vehicles and infrastructure entities (e.g., road side units, traffic lights), allowing seamless information exchange at an unprecedented scale and unlocking exciting opportunities. Opportunities arise from the availability of abundant real-time traffic data transferred from vehicles to infrastructure entities, which can lead to improved traffic modelling and state estimation, and also from the emergence of new control measures with higher granularity (e.g., traffic demand management, personalized route guidance) due to the ability to pass instructions directly from infrastructure entities to individual vehicles. In this context, the main objective of the ITS-CONNECT project is the development of novel monitoring and control solutions that exploit new capabilities that arise in the era of connected vehicles, aiming to significantly improve the efficiency of road transport by alleviating congestion at the highest possible degree.