EUROPEAN SCIENCE FOUNDATION

New Frontiers of Infinity:
Mathematical, Philosophical and Computational Prospects
Final Report (Exchange grant 2857)

To whom it may concern.

This is my final report concerning my joint work with Prof. David Asperó during my stay within the Barcelona Set Theory Group directed by Prof. Joan Bagaria for a 2–moth period (5 July– 1 September 2010).

So far Prof. Asperó and I have been working on the problem of building models of set theory satisfying consequences of the forcing axiom PFA and in which the size of the continuum is large (bigger than $\aleph_2$). This project is motivated by the popular question of whether or not the restriction of PFA to partial orders of small cardinality decides the cardinality of the set of the real numbers. During my stay in Barcelona we succeeded to extend our results in this area. In fact, we have introduced the notion of being *finitely proper* for partial orders of cardinality ω_1 and we proved the consistency of its corresponding forcing axiom together with a large continuum. Given a partial order P of cardinality ω_1, we say that P is *finitely proper* if and only if for every sufficiently large regular cardinal θ, for every finite set $\{M_i : i \in n\}$ of countable elementary substructures of $H(\theta)$ and for every condition $p \in P$ which belongs to the intersection of all the M_i's, there is a condition extending p and which is (M_i, P)–generic for all i. This is not easy to find a small partial order which is proper but not finitely proper, so this result is very near to be optimal.

Finally, I would like to point out that I explained part of this advances during the month of July in the *Set Theory Seminar of the Barcelona Research.*

6 – September – 2010

Miguel Angel Mota