I worked on several projects while in Barcelona. Concerning my main line of research, I continued to refine my proof of the graph-theoretic dichotomy at the base of the Kechris-Louveau characterization of hyperfinite equivalence relations. Of course, the ESF-INFTY project will be acknowledged in the resulting paper.

I also spent some time refining a draft of work of Conley, Lecomte, and myself concerning Komjath-Laczkovich-style dichotomy theorems. Such theorems typically state that given a pair of σ-ideals $\mathcal{J} \subseteq \mathcal{I}$ on a Hausdorff space X and a sequence $(A_i)_{i \in \omega}$ of analytic subsets of X, there exists $I \in [\omega]^\omega$ such that either $\limsup_{i \in I} A_i \in \mathcal{I}$ or $\bigcap_{i \in I} A_i \notin \mathcal{J}$. Such results typically hold when $\mathcal{I}$ and $\mathcal{J}$ are σ-ideals associated with Silver-style dichotomy theorems. On the other hand, such results do not go through when $\mathcal{I}$ and $\mathcal{J}$ are σ-ideals associated with Glimm-Effros-style dichotomy theorems. There is a measure-theoretic salvage for the latter, however, and during my time in Barcelona, Conley and I established the a more general result for locally countable analytic graphs. Of course, the ESF-INFTY project will be acknowledged in the resulting paper (which will include also the earlier work with Conley and Lecomte).

Conley and I also continued to work on our results on Borel chromatic numbers. Partially answering a question of Kechris-Solecki-Todorcevic, we showed that the shift on $[\omega]^\omega$ is not the minimum acyclic locally finite Borel graph whose underlying space cannot be written as the union of countably many invariant Borel sets on which the graph has finite Borel chromatic number. We also established a number of extensions of our earlier results on Baire measurable colorings of acyclic locally finite graphs. In particular, we extended an earlier technical result to oriented graphs, from which one can show that the graph associated with a free Borel action of an n-generated semigroup has a Baire measurable $(n+2)$-coloring. We also gave lectures on some of these results. Of course, the ESF-INFTY project will be acknowledged in the resulting paper.