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THE INTEGRATIVE ECOLOGY GROUP

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IOF Final Report

European Comission
Marie Curie International Outgoing Fellowship: Final Report
Project METAWEBS

Final Publishable Summary Report

The long-term professional project of the beneficiary is to combine analytical tools, mathematical models, simulations, and data set analysis to address fundamental and applied questions in ecology. The approach is both synthetic and interdisciplinary, merging tools and concepts from different fields to applying in the synthesis between community ecology and evolutionary biology.

The creation of long-term collaborations between the European Union and the United States of America based on common interests on ecological networks and its extension to other complex systems of a very different nature has been successful. This is the main objective of the Marie Curie International Outgoing Fellowship (IOF) because it will contribute to increase the level of internationalization of the local returning institute. That is, the beneficiary of this European Action has established a very promising international collaboration between the return European research institution (Estación Biológica de Doñana - Consejo Superior de Investigaciones Científicas) and two American Universities: Princeton University (PU) and Michigan State University (MSU). The link to the first one (PU) was established with the scientist in charge at the host institution, Simon A. Levin. It has started with an interdisciplinary paper published last year in Proceedings of the National Academy of Sciences (PNAS) on the evolution of the network of interdependences between software packages in a computer operating system. This paper has received high attention among scientists including a press coverage by PhysOrg (a very popular science, research and technology news website, http://phys.org/news/2011-12-tinkering-withevolution-ecological-implications-modular.html). The collaboration with Michigan State University was established during a short visit to the Digital Evolution Lab (Devolab) leaded by Charles Ofria. His research group is part now of the BEACON, an NSF Center for the Study of Evolution in Action (USA) which has been funded with $25 millions for the next 5 years. In collaboration with people from his group, the beneficiary has been invited by the editorial board of PLoS Computational Biology to contribute a paper on evolving digital ecological networks (in review). This will be published simultaneously in the Wikipedia and constitute the beginning of a new research line in the frontier between evolutionary biology and computer science. The leadership of this topic has been, without any doubt, the proof of the success achieved by the beneficiary thanks to the Marie Curie IOF.

The scientific career of the beneficiary has been improved in leadership capabilities as well as in scientific skills. The training he has received has enhanced his potential as a young researcher with a multidisciplinary view of the science as well as his international visibility. He has been recently invited to participate in the selection process for joining to the Editorial Board of the journal PLoS One. Besides this excellent news, the beneficiary is frequently requested to review manuscripts for top journals in his field like American Naturalist, Ecology, Journal of Ecology, Oikos, Ecography, Journal of Animal Ecology, and others, and in a few occasions for top multidisciplinary scientific journals like Science and Nature.

The beneficiary has presented his main research studies as oral contributions in high-quality international meetings such as the Ecological Society of America (ESA), the Ecological Society of Germany, Switzerland, and Austria (GfÖ), and the Society for Molecular Biology and Evolution (SMBE). He has also been invited to participate in international workshops such as the *bigDATA: Integrated Microbial Biodiversity Program* organized by the Canadian Institute for Advanced Research (CIFAR), and *The Genetics of Foundation Species as Drivers of Ecological Processes* organized by the Northern Arizona University, Flagstaff, Arizona, (USA).

The continuity of the scientific career of the beneficiary is granted at least for the next three years. He has recently been awarded a prestigious Junta de Ampliación de Estudios (JAE) postdoctoral fellowship from the Spanish Ministry of Economy and Competitiveness. He is currently working at the Estación Biológica de Doñana (EBD-CSIC), Seville (Spain), collaborating with Prof. Jordi Bascompte and developing a new research line on the evolution of networks of interacting species from artificial life approaches. This is a novel field that he is trying to push forward in Europe in collaboration with his colleagues from Michigan State University (USA).

Sincerely,

Dr. Miguel A. Fortuna

Prof. Jordi Bascompte
(Scientist-in-charge)