

About the projects financed within the Scientific Cooperation Program

The project of **prof. Josipa Bašić, PhD** (Edukacijsko-rehabilitacijski fakultet, Sveučilište u Zagrebu) and **prof. Celene Domitrovich, PhD** (The Prevention Research Center, Pennsylvania State University), „**Implementation of evidence-based prevention program of socio-emotional learning through science evaluation and it's application into Croatian kindergartens and primary schools (PATHS-RASTEM)**“, will deal with the evidence-based promotion of social development which can reduce risk for mental disorders in Croatian youth and for poor school achievement. Given the rigorous nature of the study and its proximity to the University of Zagreb, a second aim of the Croatian PATHS project is to improve the overall quality of empirical research in child development and Prevention Science in Croatia.

The Fund will grant project funds amounting to HRK 1.085.170,00 and funding amounting to HRK 295.610,00 is anticipated from other sources (The Prevention Research Center and City of Zagreb, Primorsko Goranska County and Istria County Region).

Considering the application of nanoparticles and nanomaterial project „**Nanoparticles in aqueous environment: electrochemical, nanogravimetric, STM and AFM studies**“, of **Irena Ciglencčki-Jušić, PhD** (Institut Ruđer Bošković) and **Nikola Batina, PhD** (Universidad Autonoma Metropolitana - Iztapalapa) which is financed by the Fund with HRK 798.948,00 and the remaining HRK 389.947,00 is provided from additional sources (Institut Ruđer Bošković; Croatian waters and Fish association and UAM-1), will develop new analytical method for fast, selective qualitative and quantitative NPs characterization in natural waters.

For the project of **Mirjana Maksić, PhD** (Institut Ruđer Bošković) and **Tomislav Friščić** (Department of Chemistry, University of Cambridge), „**Mechanochemistry for the clean and efficient metalcatalysed synthesis of pharmaceutical targets and the study of their molecular recognition**“ the Fund granted HRK 819.914,43, and additional HRK 248.740,00 is anticipated from other sources (Institut Ruđer Bošković; Chirallica d.o.o.; Pliva d.o.o.; Aspecta d.o.o.; Department of Chemistry, University of Cambridge; Kyoto University, Institute of Chemical Research; Renovo Research LLC). Within the proposed project it is intended to develop a catalytic and environmentally-friendly approach for the rapid and simple construction of guanidine derivatives. Guanidines are of considerable pharmaceutical importance and some of their pharmaceutically interesting derivatives are generally difficult to construct using conventional synthetic methods.

Alzheimer's disease (AD) is a uniquely human condition that is very difficult to study. There are many reasons for such difficulties, including the fact that the most rigorous analytical techniques are ethically unacceptable in patients, and that postmortem human tissue is inadequate for many additional methodologies. **Prof. Melita Šalković-Petrišić, PhD** (Medicinski fakultet, Sveučilište u Zagrebu) and **prof. Rodrigo O. Kuljiš, PhD** (The University of Texas Medical Branch at Galveston (UTMB)) will in their project „**Cytopathological characterization of the brain in a rat model of sporadic Alzheimer disease**“ employ a battery of light- and electron microscopic cytopathological methods in a unique rat model of sporadic AD, i.e. by far the most common clinical form of the disorder (ca. 98%), that was developed by the Project Leader by intraventricular injection

of streptozotocin (STZ), and agent that is selectively toxic to particular brain cells and causes changes that resemble AD.

The project is co-financed by HRK 294.000,00 HRK (The University of Texas Medical Branch), by funds provided by the Fund amounting to HRK 1.115.000,00.

Eduard Tutiš, PhD (Institut za fiziku) i **prof. Laszlo Forro, PhD** (Ecole Polytechnique Federale de Lausanne, Switzerland), as a part of their project **„New electronic states driven by frustration in layered materials“**, will study the origin of novel electronic phases through comparative study of layered materials with puzzling similarities, with the prospect of guiding a new cycle in material developments. The scientific goal is to investigate the parallels between materials, and their mechanisms of the competition, coexistence, and/or cooperation between different electronic phases.

Fund is financing this project with the amount of HRK 823.050,00 while from the other sources HRK 536.550,00 will be provided (Phys. Inst., Univ. Stuttgart and EPFL, Lausanne).

The project **„Photolithographic synthesis and electronic properties of graphene-based devices and related structures“** of **Tonica Valla, PhD** (Brookhaven National Laboratory, Pennsylvania) and **Marko Kralj, PhD** (Institute of Physics, Zagreb), is aimed at developing photolithographic capabilities at the Institute of Physics in Zagreb for fabrication of electronic devices based on graphene and other novel materials, envisioned to replace silicon in future electronics.

The primary goal of the proposed project is to adapt the existing technologies of synthesis of graphene layers and/or layers of topological insulators and to fabricate transport devices and other heterostructures based on such layers. New methods of transport properties measurements in ultra-high vacuum will also be developed that will allow studies of intrinsic properties of extremely clean devices. The Fund finances this project with HRK 953.980,00 and the project is co-financed by HRK 372.000,00 HRK (Brookhaven National Laboratory and Alexander von Humboldt equipment grant).

Prof. Vedran Deletis, PhD (Medicinski fakultet u Splitu) and **prof. Duje Tadin, PhD** (University of Rochester, NY) as a subject of the project **„Neurophysiologic markers generated by electrical and magnetic stimulation of motor speech related cortical areas“**, aim to identify the neurophysiologic markers of motor speech related cortical areas in healthy volunteers and patients. This approach will significantly contribute to the surgeries of frontal cortex by preserving motor speech related cortical areas and in the future, in the patient having surgery under general anesthesia.

Along with the co-financing of HRK 232.749,64 (Medicinski fakultet u Splitu) The Fund grants the project with HRK 1.163.747,57.

The purpose of the project **„Nano - structural materials for thin film solar cells“** is to examine the possibility of improving the efficiency of thin film solar cells based on Si by using nano-crystalline and amorphous phases for active and passive elements of device. Project leaders are **Davor Gracin, PhD** (Institut Runer Bošković) and **prof.**

Davor Balzar, PhD (University of Denver, Colorado Department of Physics and Astronomy), The Fund invests HRK 736.000,00 and from other sources in the amount of HRK 184.000,00 (Institut Runer Bošković i Solarne ćelije d.o.o. Split).

Prof. Slobodan Vukičević, PhD (Medicinski fakultet u Zagrebu) and **prof. Boro Dropulić, PhD** (Lentigen Corporation) within the project „**Bone morphogenetic protein-1 isoforms in bone regeneration**“, will study the bone morphogenetic proteins (BMPs) which are growth and differentiation factors able to induce new bone formation. This project may lead to development of an improved or novel bone device for stimulating bone repair. The Fund grants HRK 1.007.500,00 for the project and the remaining HRK 300.000,00 (Medicinski fakultet u Zagrebu i Genera Research d.o.o.) is provided from additional sources.