



Press Release

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Excellence in Africa: Six new EPFL - African universities research projects

As part of the EPFL-UM6P's Excellence in Africa initiative, the EXAF centre has announced the names of the six successful teams which will take part in the Junior Faculty Development programme (JFD).

JFD fosters collaborations between Africa-based young professors and EPFL professors on projects addressing African and global challenges. The six research projects will develop and deploy innovative solutions to respond to key priorities in areas such as clean and sustainable energy, global warming, resource efficiency, as well as health and neuroscience. The grants will also support breakthrough science that use the Internet of Things (IoT), machine learning and information technology for several applications, such as smart farming and robotics to address critical gaps.

The programme will provide funding for research projects over a period of 4 to 5 years. The six teams were selected amongst 16 shortlisted applications of the second phase of the call for proposals. They were evaluated by external independent experts and by a joint EPFL-UM6P Scientific Committee.



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Overview of the six successful research projects

1. Searching for a Parkinson's disease cure in animal venom

(Prof. Ines El Bini from Institut Pasteur de Tunis in Tunisia and Prof. Hilal Lashuel from EPFL)

Finding a therapy against Parkinson's disease remains a major challenge. The research proposed by this team aims to explore the therapeutic potential of specific classes of bioactive compounds extracted from venoms of vipers and scorpions for the treatment of Parkinson's disease. The project builds on the partners' unique expertise and is a perfect example of the win-win benefits of conducting South-North collaborative research, as promoted by EXAF.

2. Machine Learning for Energy Efficient Internet of Things Networks (Prof. El Mehdi Amhoud from the University Mohammed VI Polytechnic in Morocco and Prof. Andreas Burg from EPFL)

This project is in the field of information technology and aims to develop Internet of Things (IoT) solutions to address a number of challenges faced by African countries, such as drought and traffic jam in urban areas. This team will contribute to the application of the most recent techniques in Africa, such as smart farming and self-driving vehicles.

3. Hybrid Solar-Energy Harvester: The Nanostructures and Nano-Optoelectronics Characterization

(Prof. Sabastine Ezugwu from the University of Nigeria, Nsukka (UNN) in Nigeria and Prof. Anna Fontcuberta i Morral & Prof. Francesco Stellacci from EPFL)

Clean and renewable energy is vital for sustainable development. Solar energy is key to solving energy crises in Africa. This team will use nanotechnologies to improve the solar cells which are converting sunlight into electricity. The ultimate goal of this project is to produce cheap, affordable and efficient solar cells.

4. Embedded exact quantum dynamics for photocatalytic water splitting (Prof. Steve Ndengué from the East African Institute for Fundamental Research, University of Rwanda and Prof. Nicola Marzari from EPFL)



Producing a fuel simply from water and sunlight can seem like a dream, but it's actually possible. Unfortunately, practical applications are hampered by our limited understanding of the photochemical processes. This project will rely on a regional computational centre located in Rwanda, supported by EPFL, to simulate the dynamics of these chemical processes with accuracy; an efficient way to study this complex reaction and make the dream a reality!

5. The design of reactive, sponge-like materials for the production of chemicals and fuels from CO_2

(Prof. Samir El Hankari from the University Mohammed VI Polytechnic in Morocco and Prof. Wendy Queen from EPFL)

Metal-organic frameworks (MOF) are a class of highly porous, spongelike materials that have diverse applications, such as water purification, gas storage and separations, and catalysis. This team sees a bigger picture: they will design reactive MOFs that can capture CO_2 from gas mixtures and subsequently transform this greenhouse gas into valueadded products.

6. Exploiting the potential of underutilized African plants and agricultural wastes in biofuels production

(Prof. Thomas Kivevele from the Nelson Mandela African Institution of Science and Technology - NM-AIST - in Tanzania and Prof. Jeremy Luterbacher from EPFL)

This team will demonstrate that biofuels can be sustainable, by assessing the potential to convert diverse inedible biomass (e.g., underutilized plants) into biodiesel. In addition, the project will also target the production of high value biochemicals from such inedible biomass.

The large number of applications (182 candidates) received during the first selection phase demonstrates the significant interest raised by the programme throughout Africa. The research institutions of the six professors are based in five countries, both English-speaking and French-speaking.



There is considerable elation for these research projects which will begin in coming months. These projects should provide effective and long-term solutions to diverse challenges faced by Africa and the rest of the world. The collaboration between the host institutions and EPFL will reinforce scientific knowledge sharing between researchers. Without any doubt, both the researchers and academic institutions will benefit from this innovative programme.

A kick-off meeting will take place in spring 2021 at UM6P and, together with a series of networking and training activities, will start the next phases of the JFD programme. Workshops and seminars organised with JFD professors will contribute to the creation of an EXAF community of talented researchers with a common goal: scientific excellence.

Excellence in Africa is a joint initiative launched by UM6P and EPFL, intended to foster excellent scientific research throughout the African continent.

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