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Examples of projects

The assorted yields of the Arab Spring

At the beginning, in 2011, it all looked good. The Western liberal political model seemed to have triumphed over the authoritarian order of North Africa. Yet this rosy picture soon gave way to a more varied and, often, bleaker reality. There was the "national dialogue" and success of electoral process in Tunisia, the "negotiated" political change in Morocco, the containment of social unrest in Algeria, the authoritarian restoration in Egypt, and the civil war in Libya.

Why and how did a seemingly uniform wave of protests result in such a broad range of outcomes? Dr Alia Gana, director of research at CNRS and Deputy Director of the Institute of Contemporary Maghreb, aims to answer this question. She will analyse the dynamics of changes in the five countries referring to both political and societal models and their interpretation by social actors. She will notably study the transformation of national narratives and the processes behind the growing sense of injustice among the youth and marginalized people.

Based on field surveys and using an interdisciplinary perspective, the project will offer policy makers the most current analytical picture of political change in the five countries of North Africa, while exploring the multiple processes that shape the diversity and the specificity of their trajectories.

Researcher: Alia Gana

Host Institution: Centre National de la Recherche Scientifique (France)

ERC project: Political And socioinstitutional change in North Africa: competition of models and diversity of trajectories (TARICA)

ERC funding: €1.99 million over 4 years

The economics of "You can do it!"

The underprivileged often perceive certain goals as being beyond their reach. They may not invest towards those goals and, by doing so, they contribute to perpetuating their poverty. It's called aspiration failure. There is evidence that information on labour market opportunities, exposure to role models, and institutional change can raise poor people's aspirations, but more research is needed to understand how to leverage the aspirations and break the vicious circle leading to poverty.

Professor Eliana La Ferrara from Bocconi University aims to improve our understanding of the relationship between aspirations, social norms and the choices of disadvantaged individuals. She wants to answer a simple, and yet crucial, question: Can we design policy interventions that shift aspirations in a way that is conducive to development? In her new research, she will take a closer look at the use of media as vehicles for changing beliefs, goals and behaviour, and at institutional reforms that address specific determinants of aspiration failures.



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Researcher: Eliana La Ferrara

Host Institution: Università Commerciale Luigi Bocconi (Italy)

Project: Aspirations Social Norms and Development (ASNODEV)

ERC funding: €1,62 million over 5 years

Examining non-equilibrium many-particle systems

Many things in our everyday life are close to equilibrium, at least in thermodynamic sense: a resting ball on a football pitch or a glass of water. But we are also surrounded by phenomena that are far from equilibrium, such as cracks in materials, ice cubes melting in a drink, or storms.

Professor Tomaž Prosen, from the University of Ljubljana, studies materials in non-equilibrium state, but in the quantum realm. It is a pioneering endeavour. Quantum many-body systems, the subject of Professor Prosen's theoretical research, consist of individual constituent particles, such as atoms or electrons, that strongly interact, i.e. the behaviour of the system as a whole can be radically different from the behaviour of its individual constituents.

The results of this work may have huge potential for applications in fields such as superconductivity, novel magnetic storage systems, spintronics and quantum information systems.

Researcher: Tomaž Prosen

Host Institution: University of Ljubljana (Slovenia)

Project: Open Many-body Non-Equilibrium Systems (OMNES)

ERC funding: €2,04 million over 5 years

Making life magnetic

Biomagnetism is natural to some mud-dwelling microbes. They create magnetosomes, iron nanocrystals with exceptional properties, and use them as geomagnetic sensors.

But could we genetically endow magnetism to other living organisms? This is the challenge that Professor Hans Dirk Schüler, from University of Bayreuth, chose to take on. Recently, his lab discovered relevant biosynthetic gene clusters and for the first time succeeded in transplanting them into a foreign microorganism. Inspired by this breakthrough, he now proposes a new way for magnetisation of organisms based on bacterial magnetosome biosynthesis.

His aim is to generate a versatile synthetic toolkit for genetic magnetization of different foreign organisms. This would have a tremendous impact on various fields of biomedical research and biotechnology and might be exploited for bioproduction of tailored magnetic nanomaterials with novel and tuneable properties.

Researcher: Hans Dirk Schüler

Host Institution: University of Bayreuth (Germany)

Project: A synthetic biology approach for magnetization of foreign organisms by genetic engineering and transplantation of bacterial magnetosome biosynthesis (SYNTOMAGX)

ERC funding: €2.29 million over 5 years



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Active ageing: beyond the same old story

All too often, policy makers consider active ageing as disability prevention and a way to save on health and social care budgets. Such approach represents older people as a burden for society thus raising the risk of discrimination and so-called "ageism". But what if we looked at active ageing from a completely different angle?

Professor Taina Rantanen, from Gerontology Research Centre at the University of Jyväskylä in Finland, sees active ageing as interplay between ability, activity, ambition and autonomy. By assessing these dimensions and examining factors such as physical and psychological health, resilience, personal skills and environmental support, Professor Rantanen will introduce active ageing as a quantifiable concept – the AGNES scale – for the first time in gerontology. This approach will allow her to develop an effective active ageing intervention, based on counselling, IT resources and volunteers' support. The AGNES scale will also provide evidence to assess the feasibility and effectiveness of the proposed action.

Researcher: Taina Rantanen

Host Institution: University of Jyväskylä (Finland)

Project: Active ageing – Resilience and external support as modifiers of the disablement outcome (AGNES)

ERC funding: €2.04 million over 5 years

A new classification of psychological disorders

Psychiatric disorders pose a serious challenge to individuals and to the society. We still don't know much about their origins and how to treat them. According to the statistics, mental disorders account for 23% of years lived with disability. Only in 2010, the cost of mental disorders in Europe was estimated to be €523 billion.

Professor Gunter Schumann, at the King's College London, aims to create a new classification of psychiatric disorders (depression, ADHD and alcohol use disorders) based on neurobehavioral clusters relating brain's neural networks to behaviour symptoms. Currently, psychiatric disorders are poorly recognised and inadequately treated, and Professor Schumann's work attempts to address this clinically important problem.

Researcher: Gunter Schumann

Host Institution: King's College London (UK)

Project: Brain network based stratification of mental illness (STRATIFY)

ERC funding: €3.39 million over 5 years

Cybersecurity: Tending to the root of trust

Digital technologies and the Internet are the backbone of our society and economy. The number of connected devices may reach 100 billion in the next decade, but already today electronics accompany us everywhere and all the time. They carry data to make our lives easier. Yet they also make us more vulnerable to attacks that compromise our privacy, health or security. Securing this Internet-of-Everything is a crucial challenge of our times.

Professor Ingrid Verbauwhede, from KU Leuven, aims to tackle it on the level of digital hardware, "the root of trust." Her team will be reviewing each layer of digital hardware design from a security perspective. She will investigate the links



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between these layers, digital design flows and objectives, cryptographic algorithms and protocols, hardware and software platforms. The team will carry out security evaluations and test resistance to hacking, feeding back to the individual hardware design steps. Professor Verbauwhede compares her work to the construction of a cathedral: "Solid foundations are needed for creating the perfect edifice."

Researcher: Ingrid Verbauwhede

Host Institution: Katholieke Universiteit Leuven (Belgium)

Project: Post-Snowden Circuits and Design Methods for Security (Cathedral)

ERC funding: €2.37 million over 5 years

More information

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