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## - Examples of ERC Starting Grant Projects 2015 -



### **The making of heavy elements**

One of the least understood aspects of the chemical evolution of the cosmos is the making of elements heavier than iron. Professor Almudena Arcones Segovia from the Technische Universitat Darmstadt is set to change this.

There are two favoured astrophysical production sites of heavy elements: neutrino-driven winds following core-collapse supernovae, the violent deaths of massive stars; and mergers of neutron stars, where extreme conditions enable the rapid neutron capture process. Working on the border line of astrophysics and nuclear physics, Professor Arcones Segovia will make large-scale simulations and detailed modelling of these two processes. Her research will contribute to better understanding of the long-standing problem of nucleosynthesis in the universe.

Researcher: Almudena Arcones Segovia

Host Institution: Technische Universitat Darmstadt (Germany)

Project: The origin of heavy elements: a nuclear physics and astrophysics challenge (EUROPIUM)

ERC Funding: €1.45 million

*Image: © Gaby Otto*



### **Loess sheds new light on climate change**

Geologists have often studied the structure of ancient sediments to understand climate and make predictions on future temperatures. However, current methods do not account for regional variation, providing only a limited understanding of the abrupt shifts that have characterised the Earth's climate for thousands of years.

Dr Alida Iulia Gabor from the University of Babeş-Bolyai in Romania aims to develop a state-of-the-art approach integrating different optical and spectroscopic methods. She will apply this new method to date loess samples from across



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the world. The structure and formation of loess, a material that covers 10% of the Earth's surface, can be used to reconstruct the succession of glaciations and warming events that have happened from 2.5 million years ago to today. Being able to accurately date these events will shed light on past climate change patterns and provide information for modellers trying to understand current and future trends.

Researcher: Alida Iulia Gabor

Host Institution: Babeş-Bolyai University Cluj-Napoca (Romania)

Project: Integrated absolute dating approach for terrestrial records of past climate using trapped charge methods (INTERTRAP)

ERC funding: €1.5 million



### **Finding new ways to fight old tropical diseases**

More than a billion people suffer from tropical diseases that are little known or neglected. One of such illnesses is schistosomiasis, or snail fever, caused by parasitic worms. Despite extensive mass drug administration (MDA) it remains a major public health issue, especially in Africa, with a socio-economic impact second only to malaria amongst parasites.

Dr Poppy Lamberton from the University of Glasgow will evaluate novel strategies and new technologies to monitor the impact of MDA programmes, to identify threats to MDA effectiveness, and enhance control of schistosomiasis in sub-Saharan Africa. The results will improve monitoring protocols and inform policy makers on how best to treat the disease. Dr Lamberton will fill a critical global health knowledge gap, with findings transferable across a range of MDA controlled diseases.

Researcher: Poppy H. L. Lamberton

Host Institution: The University of Glasgow (UK)

Project: New approaches to characterise *Schistosoma mansoni* infections persisting despite mass drug administration (SCHIST\_PERSIST)

ERC Funding: €1.5 Million

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### **Y-chromosomes: it's not all about sex**

The Y-chromosome only exists in males, and its function was for a long time thought to be restricted to determining the sex and fertility. Apart from a few male-related genes, it usually consists almost exclusively of repetitive DNAs, and its role is poorly understood compared to its counterpart, the X-chromosome. These repetitive elements are considered selfish parasites of one's genome. ERC grantee Dr Zhou Qi explores how organism tames these male specific parasites in order to prevent them from harming other parts of the genome that is shared by females. He also hopes to reveal other unknown function of the Y-chromosome by tracking its epigenomic evolution in different fruit fly species. Dr Zhou joins the University of Vienna, Austria, after working at the University of California, Berkeley, and at the Beijing Genomic Institute. His work will use cutting-edge sequencing and bioinformatics techniques to shed light on the importance of this overlooked piece of evolution.

Researcher: Zhou Qi

Host Institution: University of Vienna (Austria)

Project: Evolution and Impact of Heterochromatin on a Young *Drosophila* Y chromosome (UNICODE)

ERC funding: €1.97 million

*Image: © Nicolas Gompel*



### **Diplomacy in the age of social media**

Facebook, Twitter and 24-hour news coverage put diplomats and state leaders on constant display. Professor Rebecca Adler-Nissen from the University of Copenhagen explores how they reconcile the need for close-door negotiations based on trust with the intensifying demands for more transparency. Is quiet diplomacy still possible in spite of the pressure and lures of new media? What is the relationship between confidential diplomatic negotiations and publicly displayed interventions in the media?

Professor Adler-Nissen's project will identify and analyse the repertoire of techniques and practices employed in confidential talks and in public to manage nations' 'images of self' in the information age. The research will combine participant observation, interviews and media analysis, generating new insights into 21st century diplomacy.

Researcher: Rebecca Adler-Nissen

Host Institution: University of Copenhagen (Denmark)

Project: Diplomatic Face Work; Between Confidential Negotiations and Public Display (DIPLOFACE)

ERC Funding: €1.5 Million

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### **Mending memories to improve sleep**

Our thoughts and ruminations can disturb our sleep. But how exactly this happens? And can we use our thoughts and memories also to improve our sleep? Using state-of-the-art methodology, such as high-density electroencephalography or brain imaging, Professor Björn Rasch from the University of Freiburg, Switzerland, aims to answer these questions.

Sleep disturbances are increasingly frequent in our societies, and the costs of poor sleep on productivity and health have been estimated to reach billions of euros each year. Commonly used sleep-inducing drugs typically reduce low-wave sleep (SWS), a sleep stage that is highly important for our health and optimal cognitive functioning, and can have adverse side-effects.

Professor Rasch will examine how we can use psychological means to improve sleep without medications. His main goal is to develop psychological techniques to efficiently deepen SWS. By focussing on the psychological mechanisms of sleep, his project will provide a solid scientific basis for the development of effective drug-free interventions to improve sleep and cognition in every-day life.

Project: Longing for a good night's sleep: A memory-based mechanism to improve sleep and cognitive functioning (MemoSleep)

Researcher: Björn Rasch

Host institution: University of Freiburg (Switzerland)

ERC funding: €1.5 million

*Image: © istockphoto*

### **More information:**

[ERC website](#)