



Eni Award 2020: prizes for scientific research awarded today by Eni in the presence of the President of Italy

For the first time the awards also went to the best innovative and sustainable business ideas

Rome, 14 October 2021 - The Eni Award ceremony took place today at the Palazzo del Quirinale in the presence of the President of the Italian Republic **Sergio Mattarella**, of Eni Chairman **Lucia Calvosa** and of Eni CEO **Claudio Descalzi**.

The Award, now in its 13th year, is also known as the “Nobel Prize for Energy” and has become an internationally recognised award for research in the energy and environment sectors, reinforcing the importance that scientific research and innovation have for Eni.

The prize was developed by Eni in 1987 and in 2008 has evolved into the current version of Eni Award. Since the beginning, the Scientific Commission, which evaluated the applicants’ research, is made up of scientists belonging to the most advanced research institutes in the world and over the years has seen the participation of 6 Nobel Laureates. Since its establishment in 2008, the award has received over 10,000 applications. This year's edition attracted over 500 applications.

In association with **Joule**, Eni’s business school, the company this year created an additional award for teams, university spin-offs and start-ups, with a view to encouraging technology **use, enhancement and transfer**, while promoting the creation of a **sustainable innovation** ecosystem.

Winners of the 2020 Eni Award included:

- The **Energy Transition** prize was awarded to **David T. Allen** of the University of Texas at Austin, for his research **Measuring and reducing methane emissions in the natural gas value chain**. Prof. Allen has worked on the highly topical issue of fugitive methane emissions, a greenhouse gas with a much higher global warming potential than CO₂, in the production and carriage of natural gas, with the aim of locating emission points and estimating emission amounts. This is of vital importance today, given that natural gas, of which methane is the main constituent, is a key energy source in the current phase of the energy transition. Professor Allen has contributed to this by developing new tools capable of estimating fugitive emissions with a level of spatial (individual sites) and temporal (minutes) precision that allows increasingly complete and accurate inventories to be made, which are necessary to plan targeted mitigation actions.
- The **Energy Frontiers** award for research into renewable energy sources and energy storage was given to **Chintamani Nages Ramachandra Rao** of the International Centre for Materials Science, Bangalore. Rao has researched **Solar photochemistry and thermal water splitting using Boro-Carbo-Nitrides (BCN), Molybdenum Sulphide (MoS₂) and other materials to produce green hydrogen, and energy devices based on layered materials**, for applications in energy and green hydrogen production. The same or related materials have also been shown to have beneficial properties for the construction of hydrogen storage systems and supercapacitors with high specific power and an increased number of charge-discharge cycles. The latter are energy storage devices that, in the same way as batteries, will increasingly become part of the energy systems based on renewable sources.
- Finally, the **Advanced Environmental Solutions** award dedicated to research into the protection of air, water and land and the remediation of industrial sites went to **Jürgen Caro** and **Jörg Kärger**, from the Universities of Hanover and Leipzig respectively, for their research into **Mass Transfer in nanoporous materials: paradigm shift and technological use for advanced environmental solutions**,

which have led to the development of micro-imaging techniques for the in-situ observation of diffusive flows of molecules in nanoporous materials. These techniques have been applied to allow for the detailed study of diffusion in Metal Organic Framework (MOF) and Covalent Organic Framework (COF) membranes. This work has led to the development of new materials, used in pioneering catalytic membrane reactors, which can improve operating conditions for numerous applications involving separation processes. These materials have demonstrated excellent water permeability and a high degree of selectivity for hydrophilic substances, specifically dyes. The simplicity of the synthesis, combined with the ability to create membranes with the desired specific characteristics, is a very promising step forward in the field of water nanofiltration.

- In this year's edition, three awards were given in the ***Young Talents from Africa*** category, established in 2017 on the occasion of the tenth anniversary of the Eni Award and dedicated to talented young researchers from the African Continent. The awards went to **Alaa Abbas** and **Ahmed Mohamed Ismail Tarek**, The American University in Cairo, Egypt and **Djalila Ben Bouchta**, Cairo University, Egypt. The winners will receive a scholarship that will allow them to attend PhD courses at the Politecnico di Torino and the "Federico II" University of Naples to continue their research and develop their innovative ideas.

Abbas' proposal relates to the improvement of wastewater treatment and energy production with nanostructured carbon–metal oxide anodes in microbial fuel cells. Tarek will develop a computational model to improve e-waste management. Ben Bouchta proposes a multi-disciplinary approach to the provision of energy services to enable the productive use of energy for women entrepreneurs in sub-Saharan Africa.

- The ***Young Researcher of the Year*** award is presented every year to two researchers under the age of 30 who have received a research doctorate in an

Italian university. It was won this year by **Matteo Morciano** and **Francesca De Falco**.

Morciano, a student at the Politecnico di Torino, developed innovative technologies for the **low-cost** production of drinking water using solar energy in his thesis **Solar Energy Technologies for Passive Water Desalination**. In particular, he has developed a low-cost and environmentally friendly system for desalinating water, which could offer a possible solution to the water crisis.

De Falco, from the University of Naples Federico II, in a thesis entitled **Microplastic pollution from synthetic fibres: quantitative analysis and mitigation strategies**, carried out a study into microplastic pollution, an environmental issue of considerable importance. In particular, De Falco looked at the impact of synthetic fibres used in textiles, identifying the main release mechanisms of these emerging micropollutants.

In the **Recognition of Innovation at Eni** section, which recognises the most innovative projects developed by Eni's researchers and technical experts, awards were given to:

- **Roberto Millini, Michela Bellettato and Giuseppe Bellussi** for the patent **Process for the mineralisation of CO₂ with natural mineral phases and the use of these products in the formulation of cements**.
- **Giovanna Carpani, Ilaria Pietrini** for the **e-limina®** technology, linking isotopic and microbial investigations to aid the analysis of the biodegradation of contaminated sites (natural attenuation);
- **Filomena Castaldo, Orazio Lo Chiano, Alessandro Riva** for the **intensified CO₂ bio-fixation** technology, which is based on the bio-fixation of CO₂ by microalgae in photobioreactors lit by an artificial light adapted specifically for optimal photosynthesis.

Special mention "Eni Joule for Entrepreneurship" to the teams:

- **Bi-rex**, an early stage start-up (TRL 4) that has developed a green process for biopolymer production (tree-free cellulose and chitin). A significant example of **female entrepreneurship**, Bi-rex was founded by two researchers from the Politecnico di Milano and is in the process of industrial development thanks to the support of a business angel. Recognised by Joule at the 2020 “StartCup Lombardia”, it has benefitted since January 2021 from a customised incubation scheme led by Polihub, with the methodological support of Joule.
- **ResourSEAs**, an intermediate start-up (TRL 6), operates in services for the circular exploitation of saline solutions, including mineral recovery and energy production. Founded as a spin-off of the University of Palermo (UniPa), with a patent already filed, it then joined the Joule acceleration scheme and is carrying out experiments with the support of Eni R&D. The team is made up of professors and researchers who are highly specialised in STEM disciplines (chemistry, physics and engineering).
- **RESET** (Renewable Energy Solutions Environmental Technology), which has a very high level of maturity (TRL 9), is now an SME based in Rieti and deals with combined heat and power generation through biomass gasification. Started in 2015 by four founders, it now has around 70 employees. Selected by Joule in Elis's Open Italy 2020 programme, it has just completed a trial run with Eni.

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