

PRESS RELEASE

## Europe-based conferences series and scientific awards to support research on artificial molecular machines

*The development of molecular machines and motors at the molecular scale is a hot topic of nanoscience with a revolutionary potential in several areas of technology and medicine. A new conferences series – Mach-5 – is launched in the Old Continent, along with scientific prizes named after the three Nobel laureates in Chemistry for molecular machines. These initiatives will favor the exchange of ideas, particularly among young scientists, the emergence of ground-breaking visions and the recognition of creativity in a burgeoning research field. The first conference of the series will be held in Plön, Germany, on September 11-14, 2022.*

Kiel and Bologna, 05 September 2022 - Miniaturization of electronic and magnetic devices spurred unprecedented, technological developments in information processing and storage. As a consequence, the progress in microelectronics exerts an increasing impact on modern societies. Downscaling mechanical devices and machines is expected to have a similar technological and societal impact. Although the field is still in its infancy, research in the past three decades has shown that the concepts of macroscopic device and machine can be transferred to the molecular or supramolecular level. Moreover, it has become evident that applications of molecular devices and molecular machines, enabled by appropriately integrating/interfacing them with their surroundings, could provide radically innovative solutions to significant problems in many areas of technology and medicine. The scientific maturity of this research and its great potential for breakthrough applications were testified by the award of the Nobel Prize in Chemistry 2016 to three founding fathers of the field, namely, Jean-Pierre Sauvage, Fraser Stoddart and Ben Feringa.

**Mach-5 conferences series.** Mach-5 stands for “Molecular Machinery: Making, Measuring, Modeling”. The conferences will be held every two years in an European country, and will target scientists who are active in the field of molecular machines and their components (motors, switches, rotors, actuators, etc.). The focus will be on the specific functions (directed motion, pumping, sensing, assembly, information storage, processing...) that arise from coupling to an energy source or trigger (light, redox, concentration gradient, electric, magnetic fields, etc.) and their interaction with the environment (solution, surface, polymers, biological systems, etc.). The format of the conferences is highly innovative. Only young scientists give talks, with ample room for discussion; senior scientists are welcome as chairs, tutorial advisors and discussion panelists. The contributions will feature *intro talks* (presentation of research program by emerging group leaders), *idea pitches* (short ads of project concepts by young researchers), *vision statements* (reflection on general problems, prospects and emerging areas by established senior scientists), and *beyond science* (selected contributions on cultural, socio-economic, political and artistic aspects related to science).

The first Mach-5 conference will be held at the Plön Castle, in Northern Germany, on 11-14 September 2022, organized by Profs. Rainer Herges (University of Kiel) and Alberto Credi (University of Bologna), and partly supported by a donation of Prof. Fraser Stoddart, the European Research Council (ERC), through an Advanced Grant to Alberto Credi, and the Deutsche Forschungsgemeinschaft (DFG). Future editions of the meeting are scheduled in the summer of 2024 near Bologna, Italy, and in 2026 near Strasbourg, France.

**Sauvage-Stoddart-Feringa (SSF) Prizes.** The prizes are awarded biennially, in coincidence with the Mach-5 conference, and consist of one senior and one junior prize. Candidates need to be nominated by individual researchers or research institutions with consolidated reputation in the field of molecular machines and related disciplines, and the winners are selected by a panel of international experts. The senior prize is awarded to accomplished researchers who have made outstanding contributions to shape the field of artificial molecular machines with the design, synthesis and investigation of novel systems. The junior prize is reserved to young scientists (under 40 years old and less than 12 years from the PhD title), not holding a permanent position, who have made original outstanding contributions to the design, synthesis and study of artificial molecular machines. Both awardees are invited to deliver a lecture at the Mach-5 conference.

**The SSF awardees 2022.** The SSF senior prize 2022 is awarded to Prof. *Vincenzo Balzani*. He is emeritus professor of Chemistry at the University of Bologna, and he is a highly cited chemist with a *h*-index well above one hundred. In the early years of his career, he laid the foundations for the study of photochemical reactions of coordination compounds, with a series of works that have been a source of inspiration for scientists from many countries. In the 1970s Prof. Balzani was one of the first researchers to propose the conversion of solar energy into chemical energy through the photosensitized splitting of water into hydrogen and oxygen. He explored in detail the properties of the Ruthenium-tris-bipyridine complex, one of the most important molecules of modern chemistry, demonstrating its utility in many chemical processes of application importance (for example, as a photocatalyst and as a sensor). Since the 1980s he designed and investigated multi-component molecular devices capable of performing a wide variety of functions (e.g., molecular logic gates and circuits). In the same period, he developed the concept of mechanical molecular machine, and explored early prototypes based on supramolecular compounds. His work on molecular shuttles, rotary switches and elevators driven by light, electricity or chemical fuels has been a source of inspiration for the generations of chemists that today are bringing molecular machines, and nanotechnology, to a next level of complexity. Prof. Balzani has always combined scientific research with an intense dissemination activity on the relationship between science and society and between science and peace, with particular reference to energy and resource issues.

The SSF junior prize 2022 is awarded to Dr. *Víctor García-López*, assistant professor at Louisiana State University in Baton Rouge, USA. He started his scientific education by studying chemistry in Monterrey (ITESM, Mexico) and in Mexico City (CINVESTAV), where he finished his undergraduate studies. In 2011, he joined the renowned research groups of Prof. James Tour and Prof. Marti at Rice University in Texas, to work on artificial molecular machines. After a postdoc fellowship at ETH in Zürich (Switzerland) and Rice University (Texas), he was appointed to his current position as assistant professor at Louisiana State University (USA). Dr. Garcia-Lopez already proved his scientific talent in his doctoral thesis by the design and synthesis of molecular machines that work in the liquid phase. Based on these results he prepared molecular motors that operate in live cells and destroy cancer cells by disruption of their cell membranes. Other highlights of his research include motorized nanocars that drive on metal surfaces. He constructed the fastest electrically driven molecular car, winning the First International Nanocar Race in 2017 and he designed and build the first nanocar that is controlled and powered by light. Dr. Garcia Lopez received a number of honorable awards. He will continue to be a leader in the field of molecular machines closing the gap between basic research and applications.

For information

Mach-5 web site: [https://mach-5.org/pages\\_en/index.html](https://mach-5.org/pages_en/index.html)

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