

### Fernando Martín, King Jaime I Prize in Basic Research



Fernando Martín, Full Professor at the Chemistry Department of the Universidad Autónoma de Madrid and researcher at IMDEA-Nanociencia, has been awarded the King Jaime I Prize in Basic Research in its 2017 edition. The jury has recognized his role in the establishment of the theoretical foundations of **attochemistry**. This emerging scientific field aims at observing and manipulating the electronic motion in atoms and molecules in their natural time scale, the *attosecond* ( $10^{-18}$  seconds), so as to control the chemical properties of substances and modify their natural behaviour. Although the first steps in this new scientific field date back only a decade ago, it is expected to become a multidisciplinary tool with numerous applications in chemistry, physics or biology, for example, to control the evolution of a chemical reaction, obtain images of charge transfer processes in individual molecules or influence the biological response to radiation, whether desired or undesired.

The demonstration that attosecond science can have a large impact in chemistry came in 2014, when, with the help of sophisticated computational modelling, it was shown ([Science 346, 336](#)) that experiments in which the amino acid phenylalanine is irradiated with attosecond laser pulses are indeed able to monitor the movement of electrons, and hence to modify the properties and chemical behaviour of the molecule.

According to the award-winning, the next steps in this field point to the use of *attosecond techniques* to prevent undesired chemical reactions, as those biological processes leading to adverse effects or, conversely, to induce chemical reactions that are currently impossible, which could lead to the production of new substances or materials. According to a recent article (*Chemical Reviews*, DOI: [10.1021/acs.chemrev.6b00453](https://doi.org/10.1021/acs.chemrev.6b00453)), the measurement and control of electronic motion in complex molecular structures is a formidable challenge that must be tackled in a multidisciplinary way, including intensive theoretical modelling in supercomputers, and may have a strong impact in chemistry for years to come.

### King Jaime I Prizes

The [Rey Jaime I](#) Award recognizes researchers whose work is highly significant and has been developed for the most part in Spain. Throughout its 28 editions, it has been awarded to more than 100 researchers, the most important figures of the scientific, technological and entrepreneurial world of Spain. Many of the winners have received, during their careers, other relevant national and international awards.

### Fernando Martín

Fernando Martín was born in Madrid, Spain, in 1961. He graduated in Chemistry in 1984 and Physics in 1986 at the Universidad Autónoma de Madrid. He received his Ph.D. at the same university in 1986. He completed his postdoctoral studies at the University of Bordeaux (1988), the Université de Paris VI (1989–1990), and the University of Chicago (1995–1996). He has been Full Professor at the Universidad Autónoma de Madrid since 2005. He obtained the national research price Rey Juan Carlos I on 2000 and the prize of the Spanish Royal Society of Chemistry in 2010. He is currently Chair of the “[Cátedra UAM-Fujitsu](#)” on Scientific Computing and Big Data.

His research focuses on the theoretical modelling of photoexcitation and photoionization of atomic and molecular systems induced by synchrotron radiation and ultrashort laser pulses, as well as that of complex molecular systems, isolated or deposited on surfaces. He has published almost 400 articles, and since 2011, he has been the recipient of an Advanced Grant of the European Research Council to lead a project focused on the development of computational tools for the study of processes that occur in the femto- and atto-second timescales ([XCHEM](#)).

In the last years, his research group (<https://campusys.qui.uam.es/>) has attracted significant funding from the European Union (projects ERC-AdG- 290853 [XCHEM](#), COST Action [CM0702](#), MCA-ITN- 264951 [CORINF](#) y MSCA-EJD-642294 [TCCM](#), MCA-RIG- 268284 [ATTOTREND](#)) and national programs funded through MICINN, MINECO and the AEI (projects FIS-2016-77889-R, FIS-2013-42002-R, FIS-2010-15127 and PIM2010EEC-00751-ERA-Chemistry), which has allowed him to establish what is perhaps the reference research group in Europe in the area of "Theoretical Attochemistry".