

Professor Pedro Molina

A Tribute



Pedro Molina was born in Totana (Murcia), a small village in the South-East of Spain, in 1945. After being educated at the secondary school of Totana, he studied at the University of Murcia (UMU), where he gained a first class honours B.Sc (*Premio Extraordinario de Licenciatura*) in 1968. Then, his career took a turn that may be seen as unexpected: in the period 1968-1970 he became a teacher in a Secondary School in Cehegín (Murcia) during his military service. However, after finishing this service in 1971 he became a postgraduate researcher in the laboratory of Prof. Antonio Soler Martínez in UMU (Spain). There, he prepared his Ph.D. that he defended in Murcia to obtain a PhD degree in Chemistry. During his Ph.D. studies (1971-1973) he held a prestigious fellowship (*Beca de la Fundación Juan March*), that is reserved for top-level students. Later, he joined the group of Prof. A. R. Katrizky at the University of East Anglia (Norwich, UK) for his postdoctoral training (1976-1978). He then became a staff member at the Department of Organic Chemistry at the UMU. His first appointment was as an assistant in the Laboratory of Organic Chemistry and with time he gradually advanced to the position of Lecturer (1978), Reader (1978) and Full Professor (1980). He was head of the Department of Organic Chemistry from 1979 until 1994.

In Murcia, in particular, and in Spain, in general, where at that time only poor research facilities were available, he started a research line on the chemistry of fused heterocyclic compounds bearing a bridgehead nitrogen atom. Although during the early years he suffered very poor working conditions, tight budgets and meagre administrative support, Pedro Molina remained active in the area of heterocyclic chemistry research and made notable achievements in the application of iminophosphoranes to the synthesis of a wide variety of nitrogen-containing heterocycles. In retrospect, he now must be highly gratified to have been privileged to witness

the rapid growth in organic chemical research both in Murcia and throughout Spain and he must certainly be pleased to note the results of the efforts of all a generation of Spanish researchers.

As a professor at the Faculty of Science of the UMU, Pedro Molina has always played a full and active role, being especially effective in bringing major equipment grants. Nevertheless, he has served the UMU in some other ways: he was Vice Rector for Research (1994-1998).

Pedro Molina is a dedicated and illustrious teacher. He deeply impresses his students by presenting the beauty of organic chemistry in a very logical and captivating manner. He lectures in a style that gets one involved, which has led many of his undergraduate students to choose a career in organic chemistry. Nevertheless, he always demands the best effort from his co-workers, both intellectually and experimentally, having learned from him the tenacity which must accompany research work. He is now 60 but full of vitality: he is very active organizing seminars, meetings, group colloquia and so on.

Pedro Molina has authored over 300 papers. He also authored the Chapter 5.26 on "*The Synthesis of Functions with at Least One Oxygen: Y=C=O*" in the first edition of *Comprehensive Organic Functional Transformations* (A. R. Katritzky, O. Meth-Cohn, C. W. Rees). Among the reviews published by him the most noteworthy is that entitled "*Iminophosphoranes: Useful Building Blocks for the Preparation of Nitrogen-Containing Heterocycles*" (*Synthesis*, 1994). Throughout his university career, Prof. Molina has worked in close contact with the pharmaceutical industry (Lilly, PharmaMar, etc.), frequently collaborating on projects. He has lectured extensively at International Symposia or Congresses around the world (Belgium, UK, France, USA) and at the Gordon Research Conferences. Furthermore, many of his former students and postdoctorals have gone on to success in academic life.

His research has been mainly devoted to the field of heterocyclic chemistry: synthesis, structural characterisation and biological evaluation (by other partners) of organic, mainly new heterocyclic, compounds and total synthesis of natural products. However, in the middle 1990s Pedro Molina initiated research on ferrocene chemistry with the aim of developing new synthetic methodologies for the preparation of new kinds of mononuclear metallocenes and homo- or heterometallic polymetallocenes with the structural feature of having one or several aza-heterocyclic, aza-dienic or heterocumulenic linkages. These redox-active derivatives, bearing donor-acceptor systems linked by a π -spacer are excellent benchmarks for the study of intermolecular electron-transfer phenomenon and, consequently, to evaluate the molecular-wire character of such spacers. Now, new and interesting results are being obtained from an extensive investigation in this area, especially those related to the study of molecular recognition and to the preparation of new electrochemical and fluorescent sensors.

Pedro Molina has been distinguished with the Medal of the Regional Academy of the Sciences and he is also now an elected Member of this Academy.

He is married to his co-worker Prof. María Jesús Villaplana and they have two children (Javier and Elena) and although he is unbelievably active in his science, he is also a good father and a good husband.

In his non-chemical hours he enjoys football and gardening and is an avid collector of fine wines. Fortunate, indeed, are those who have shared a little wine taking part not only in a chemical discussion but also in discussions about his hobbies.

Selected Recent Publications of Professor Pedro Molina

1. Preparation of [5+6]-, [6+6]-, and [6+7]-Bicyclic Guanidines from C,C'-Bis(iminophosphoranes). Molina, P.; Obón, R.; Conesa, C.; Arques, A.; Velasco, M. D.; Llamas-Saiz, A. L.; Foces-Foces, C. *Chem. Ber.* **1994**, *127*, 1641.
2. Synthesis of a Novel Class of Macrocyclic Compounds Containing 1,3,4-Thiadiazole Rings as Subunits. Molina, P.; Tárraga, A.; Gaspar, C.; Espinosa, A. *J. Org. Chem.* **1994**, *59*, 3665.
3. Iminophosphorane-Mediated Synthesis of the Fascaplysin Alkaloid of Marine Origin and Nitramarine. Molina, P.; Fresneda, P. M.; García-Zafra, S.; Almendros, P. *Tetrahedron Lett.* **1994**, *35*, 8851.
4. Synthesis of Pyrrolo[2,1-c][1,4]benzodiazepines *via* an Intermolecular Aza-Wittig Reaction. Synthesis of the Antibiotic DC-81. Molina, P.; Díaz, I.; Tárraga, A. *Tetrahedron*, **1995** *51*, 5617.
5. Usual Reactivity of (Vinylimino)phosphoranes and Their Utility in the Preparation of Pyridine and Dihydropyridine Derivatives. Molina, P.; Pastor, A.; Vilaplana, M. J. *J. Org. Chem.* **1996**, *61*, 8094.
6. Iminophosphorane-Mediated Synthesis of 1-Acyl- α -Carbolines: A New Access to the Alkaloids Eudistomin T, S and Xestomanzamine A of Marine Origin. Molina, P.; Fresneda, P. M.; García-Zafra, S. *Tetrahedron Lett.* **1996**, *37*, 9353.
7. Structural Characterization and Electrochemical Study of Novel Ferrocene-Derivatives Prepared from [(α -ferrocenylvinyl)imino]phosphorane by aza-Wittig Reactions. Molina, P.; Pastor, A.; Vilaplana, M. J.; Velasco, M. D.; Ramírez de Arellano, M. C. *Organometallics* **1997**, *16*, 5836.
8. Synthesis of Imidazo[1,5-c]benzodiazepines *via* and Aza-Wittig/Carbodiimide-Mediated Annulation Process. Molina, P.; Tárraga, A.; Curiel, D. *Tetrahedron* **1997**, *53*, 15895.
9. A Generalized and Efficient Preparation of a Novel Class of Macrocyclic Bis(guanidines) from Cyclic Bis(carbodiimides). Molina, P.; Alajarín, M.; Sánchez-Andrada, P.; Sanz-Aparicio, J.; Martínez-Ripoll, M. *J. Org. Chem.* **1998**, *63*, 2922.
10. Preparation and Intermolecular Cyclization of Bis(carbodiimides). Synthesis and X-ray Structure of 1,3-Diazetidino-2,4-diimine Derivatives. Molina, P.; Alajarín, M.; Sánchez-Andrada, P.; Foces-Foces, C. *J. Org. Chem.* **1999**, *64*, 1121.
11. Synthesis of marine Alkaloids Isonaamine A, Dorimidazole A and Preclathridine A. Iminophosphorane-Mediated Preparation of 2-Amino-1,4-disubstituted Imidazoles from α -Azido-Esters. Molina, P.; Fresneda, P. M.; Sanz, M. A. *J. Org. Chem.* **1999**, *64*, 2540.
12. Solid-Phase Synthesis of Bis(guanidines) Based on Aza-Wittig/Carbodiimide-Mediated

- Annulation Process. López-Cremades, P.; Molina, P.; Aller, E.; A. Lorenzo, A. *Synlett* **2000**, 1411.
13. A Convenient Divergent Approach to the Alkaloids Isaindigotone and Luotonin A. Molina, P.; Tárraga, A.; González-Tejero, A. *Synthesis* **2000**, 1523.
 14. Homotrimetallic Oxazolo-Ferrocene Complexes Displaying Tunable Cooperative Interactions Between Metal Centers and Redox Switchable Character. Tárraga, A.; Molina, P.; Curiel, D.; Velasco, M. D. *Organometallics* **2001**, *20*, 2145.
 15. A convergent Approach to Midpacamide and Dispacamide Pyrrole-imidazole Marine Alkaloids. Fresneda, P. M.; Molina, P.; Sanz, M. A. *Tetrahedron Lett.* **2001**, *42*, 851.
 16. Synthesis, Structural Characterization and Properties of a New Range of Stained 2-Aza[3]ferrocenophane Ligands: Dual Behavior as Electrochemical Sensors of Metal Ions or Anions. Tárraga, A.; Molina, P.; López, J. L.; Velasco, M. D.; Bautista, D. *Organometallics* **2002**, *21*, 2055.
 17. Synthesis of the Novel Chiral 1,3-Amino Alcohol 8-*N,N*-Bis(ferrocenylmethyl)-aminomentol and its Use as Catalyst in the Enantioselective Addition of Diethylzinc to Aldehydes. Vilaplana, M. J.; Molina, P.; Arques, A.; Andrés, C.; Pedrosa, R. *Tetrahedron: Asymmetry* **2002**, *13*, 5.
 18. Carbodiimide-Mediated Preparation of the Tricyclic Pyrido[3',2':4,5]pyrido[1,2-c]pyrimidine Ring System and its Application to the Synthesis of the Potent Antitumoral Marine Alkaloid Variolin B and Analog. Molina, P.; Fresneda, P. M.; Delgado, S. *J. Org. Chem.* **2003**, *68*, 489.
 19. One-flask Conversion of *N*-Aryliminophosphoranes into *N*₁,*N*₂,*N*₃-Triarylguanidines Promoted by TBAF. Molina, P.; Aller, E.; Lorenzo, A. *Synlett* **2003**, 714.
 20. A New Multifunctional Ferrocenyl-substituted Ferrocenophane Derivative: Optical, Electronic Properties and Selective Recognition of Mg²⁺ Cation. López, J. L.; Tárraga, A.; Espinosa, A.; Velasco, M. D.; Molina, P.; Lloveras, V.; Vidal-Gancedo, J.; Rovira, C.; Veciana, J.; Evans, D. J.; Wurst, K. *Chem.-Eur. J.* **2004**, *10*, 1815.
 21. Synthesis and Properties of a New Class of Nitrogen-Rich Multinuclear [m,n]Ferrocenophanes. Tárraga, A.; Otón, F.; Espinosa, A.; Velasco, M. D.; Molina, P.; Evans, D. J. *Chem. Commun.* **2004**, 458.
 22. A Copper- and Amine-Free Sonogashira Coupling Reaction Promoted by a Ferrocene-Based Phosphinimine-Phosphine Ligand at Low Catalyst Loading. Arques, A.; Auñón, D.; Molina, P. *Tetrahedron Lett.* **2004**, *45*, 4337.