

Young Career Focus: Professor Cristina Nevado (University of Zürich, Switzerland)

■ **Background and Purpose.** *SYNFORM* will from time to time meet young up-and-coming researchers who are performing exceptionally well in the arena of organic chemistry and related fields of research, in order to introduce them to the readership. This *SYNSTORY* with a **Young Career Focus** presents Professor Cristina Nevado, University of Zürich, Switzerland.

BIOGRAPHICAL SKETCH



Prof. C. Nevado

Cristina Nevado was born in Madrid in 1977. She studied chemistry at the Autónoma University of Madrid graduating in 2000. In October 2004 she received her PhD in organic chemistry at the same university working with Professor Antonio M. Echavarren on the cyclization of 1,6-enynes catalyzed by late transition metals. In December 2004 she joined the lab of Professor Alois Fürstner at the Max-Planck-Institut für Kohlenforschung (Germany) working on the total synthesis of bioactive marine macrolides. Since May 2007 she is Assistant Professor at the Organic Chemistry Institute of the University of Zürich (Switzerland). Her research interests involve the development of new methodologies based on late transition metals and their application in the total synthesis of complex natural products.

INTERVIEW

SYNFORM | *What is the focus of your current research activity?*

Professor Nevado | Our group is interested in the synthesis of naturally occurring molecules by means of chemical methods. We believe natural products provide an enormous synthetic challenge for organic chemists. In contrast to primary metabolites, available through the assembly of their corresponding building blocks in a chemical laboratory, the synthesis of natural products is far from routine. The reason is directly related to the immense structural complexity and diversity that nature is able to introduce in its secondary metabolites. This highly varied structural scenario demands from organic chemists the development of new reactions, reagents and catalysts to achieve our targets.

In the past five years, our group has developed a multidisciplinary research program supported on three pillars: first, the development of new methodologies for the synthesis of C–C and C–X bonds based on late transition metal catalysis, with special focus on gold; second, the application of such methods to streamline the synthesis of complex natural products; and third, the study at a molecular level, both computational and experimentally, of relevant biological processes influenced by these complex organic molecules, including cancer progression, cancer metastasis and cell motility.

SYNFORM | *When did you get interested in synthesis?*

Professor Nevado | I felt fascinated by the power of organic synthesis as an undergraduate student. At that time, I used to read articles reporting the total synthesis of complex natural products, and found myself unable to recognize many of the reactions that were employed. However, I was able to appreciate the challenge and beauty in the construction of molecular complexity impregnating many of those reports. After a PhD focused on methodology development, I wanted to “learn by doing” and explore complex natural product synthesis during my time as a post-doctoral associate.

SYNFORM | *What do you think about the modern role and prospects of organic synthesis?*

Professor Nevado | I truly believe that the development of new methodologies is fully worthy when coupled to the resolution of challenging, previously unsolved, synthetic problems. Connecting both methodology development and complex organic synthesis is a challenging but extremely attractive endeavor, to which our research group aims to contribute.

SYNFORM | *Your research group is active at the frontier of organic synthesis and catalysis. Could you tell us more about your research and its aims?*

Professor Nevado | We have taken advantage of gold complexes as soft carbophilic Lewis acids to activate propargylic carboxylates generating non-classical gold-stabilized carbocations. These electron-deficient species are able to store the stereochemical information of the starting material, enabling the stereocontrolled formation of five-, six- and seven-membered rings. These methods have offered us a straightforward access to the enantioselective syntheses of natural products such as frondosins, carvones, etc. In parallel, we have also

targeted the development of Au(I)/Au(III) redox catalytic cycles to trigger novel C–H functionalizations, C–F bond-forming reactions and flexible alkene difunctionalizations.

Our group has also reported the first total synthesis of iriomoteolide 3a, a novel marine macrolide with a promising biological profile. Our work has enabled the in-depth study of the cellular targets of this molecule, revealing the iriomoteolides as effective tools to study the cellular cytoskeleton.

SYNFORM | *What is your most important scientific achievement to date and why?*

Professor Nevado | I feel the most important contribution is still to come: we have shown that new gold reactivity can be discovered, enabling both previously challenging transformations as well as the rapid stereocontrolled construction of molecular complexity. In the future, our research will aim to embrace a more ambitious goal that transcends the individual disciplines: the design and efficient synthesis of organic molecules and their use as molecular probes to understand/modulate biologically relevant processes. ■

Matteo Zanda