J. Cossy

# Janine Cossy

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**Education**: 1974 Master's degree, Université de Reims
1979 PhD with Prof. J. P. Pète, Université de Reims
1980–1982 Postdoctoral position with Prof. B. M. Trost, University of Wisconsin–Madison (USA)
**Awards**: **1987** CNRS Bronze Medal; **1996** CNRS Silver Medal; **2005** Royal Society Rosalind Franklin International Lectureship; **2009** Prix Le Bel from the Société Chimique de France
**Current research interests**: Synthesis of complex biologically active molecules; development of efficient chemo- and enantioselective methods
**Hobbies**: Painting, reading, walking, watching sumo tournaments

*The author presented on this page has published more than **10 articles** in Angewandte Chemie since 2000, most recently:*
"Palladium-Catalyzed Asymmetric Allylic Alkylation of Cyclic Dienol Carbonates: Efficient Route to Enantioenriched γ-Butenolides Bearing an All-Carbon α-Quaternary Stereogenic Center": J. Fournier, O. Lozano, C. Menozzi, S. Arseniyadis, J. Cossy, *Angew. Chem.* **2013**, *125*, 1295–1299; *Angew. Chem. Int. Ed.* **2013**, *52*, 1257–1261.

## What I look for first in a publication is … the abstract and schemes.

The most important thing I learned from my parents is … to work hard.

If I could have dinner with three famous scientists from history, they would be … Louis Pasteur, Marie Curie, and Pierre Curie.

If I were not a scientist, I would be … a wine grower.

The most exciting thing about my research is … unexpected results that can change the orientation of a project.

The best stage in a scientist's career is … to be a postdoctoral fellow in an internationally recognized group.

The best advice I have ever been given is … do your best and never look backwards.

I can never resist … a glass of champagne.

The downside of my job is … administration that is a pain and committees that are time-consuming and most of the time useless.

My favorite pieces of music are … "Pennsylvania 6-5000" by Glenn Miller and "My Favorite Things" by John Coltrane.

My "dream reaction" is … the replacement of a carbon atom by a heteroatom in a regio-, chemo-, and stereoselective fashion.

***What is the biggest challenge you have faced?***

The decrease in basic funding and the current economic situation mean that the challenge is to find funding every single year in order to have a group of a reasonable size that can compete with other groups in the world.

***How should the field of total synthesis respond to the reduction in funding?***

Publications on total synthesis are not cited as well as publications on new methods, which causes problems in times when bibliometric data become essential in evaluations. This might be one reason why funding for such research is decreasing. Though total synthesis is one of the best ways to train students in organic chemistry and in logical thinking. In addition, it is a good way to prove that a new reaction is robust, chemo-, regio-, diastereo-, and/or enantioselective; and it points at problems that require new and efficient reactions. In addition, it should be made clear that complex natural products are good starting points to discover new biologically active compounds.

***Upon discovering a new chemical transformation, are you primarily interested in the scope or in the mechanism of the reaction?***

Depending on the context, the scope can be a priority but the mechanism has to be studied in order to increase the yield and/or to broaden the scope of the reaction. Scope, limitation, and mechanism are interconnected.

***Which emerging methods do you feel will have the greatest impact on the field of total synthesis?***

Highly chemoselective methods using new organometallic catalysts to allow the synthesis of complex molecules without any protecting groups.

### How do you handle the ever-growing amounts of published literature in chemistry?

There is an increasing amount of journals and publications and it is important to make a choice to have access to the more important and current information in our field of research. I survey what I consider to be the "main journals" (20 to 25 of them) that I read regularly. In addition, there are some journals where the abstracts of important articles are reported, plus I check databases to verify if I have not missed any important information. Then, there are what I consider "secondary journals" that I browse occasionally, but at least every six months.

### How is the situation today regarding the reproducibility of scientific results?

At any time, there are mistakes that were not made on purpose, however, some results were and continue to be faked. Everybody has to be critical and to not take all the information reported in the literature to be true. I don't think that there are more problems with reproducibility of scientific results than there were 30 years ago. Even with an increase of reported results, the percentage of unreproducible results remains quite similar. The lack of reproducibility can be very frustrating, but sometimes it can give access to new and interesting results.

### What principles guide you in the selection of research topics to work on?

When I am looking at the formulas of complex molecules, I fall in or out of love with them. If I fall in love, then I am looking at their biological properties. If the biological properties are interesting, I go for their synthesis and try to find a viable synthetic and step-economical route to access these molecules. In addition, complex molecules can be a good source of inspiration to develop new methods to solve the problems encountered during their synthesis. The development of methods by themselves comes from the reading that I have done, and I try to make a connection between different publications to have original access to new molecules.

### What is the motivation behind the search for scientific discoveries?

Curiosity; to push back the frontiers of knowledge; to develop new fields of research; to create new molecules and/or catalysts that can be useful in chemistry, biology, and physics.

*The interview questions were provided by Nuno Maulide (Max Planck Institute for Coal Research, Mülheim an der Ruhr).*

**My 5 top papers:**

1. "Synthesis of Bicyclic Cyclopentanols by Photoreductive Cyclization of δ,ε-Unsaturated Ketones": D. Belotti, J. Cossy, J. P. Pete, C. Portella, *J. Org. Chem.* **1986**, *51*, 4196 – 4200.
   In this paper, we reported a highly chemoselective single electron transfer (SET), induced by UV light, between a ketone and triethylamine. This photochemical reaction allows the generation of radicals without the use of any metals and/or toxic reagents and was utilized to synthesize a variety of complex molecules.
2. "Ring expansion—Formation of Optically Active 3-Hydroxypiperidines from Pyrrolidine Methanol Derivatives": J. Cossy, C. Dumas, D. Gomez Pardo, *Eur. J. Org. Chem.* **1999**, 1693.
   This paper shows that optically active prolinols, synthesized from proline, are transformed to optically active 3-hydroxypiperidines when they are treated with trifluoroacetic anhydride, then triethylamine, and then sodium hydroxide. These compounds are important building blocks that can be transformed to natural and/or bioactive compounds.
3. "Chemoselective Cross-Metathesis Reaction. Application to the Synthesis of the C1 – C14 Fragment of Amphidinolide 3": S. BouzBouz, J. Cossy, *Org. Lett.* **2001**, *3*, 1451 – 1454.
   In this paper, we show that the cross-metathesis using the Grubbs – Hoveyda catalyst is very chemoselective and is able to differentiate the double bond of an allylic acetate and the double bond of an homoallylic acetate.
4. "Iron-Catalyzed Cross-Coupling of Alkyl Halides with Alkenyl Grignard Reagents": A. Guérinot, S. Reymond, J. Cossy, *Angew. Chem.* **2007**, *119*, 6641 – 6644; *Angew. Chem. Int. Ed.* **2007**, *46*, 6521 – 6524.
   A cross-coupling reaction between alkyl halides and alkenyl Grignard reagents using $FeCl_3$ was developed. The reaction is very chemoselective and can tolerate a variety of functionalities such as ethers, acetals, amides, and esters.
5. "Rhodium-Catalyzed Cycloisomerization Involving Cyclopropenes: Efficient Stereoselective Synthesis of Medium-Sized Heterocyclic Scaffolds": F. Miege, C. Meyer, J. Cossy, *Angew. Chem.* **2011**, *123*, 6054 – 6059; *Angew. Chem. Int. Ed.* **2011**, *50*, 5932 – 5937.
   In this paper, a safe intramolecular cyclopropanation of C=C bonds, catalyzed by $Rh^{II}$ and without any explosive diazo compounds or other precursors, is reported.

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