

Yoann Coquerel, PhD

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49 years old, CNRS Research Director (Section 12)

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Background

After a PhD (2001, Université Grenoble-Alpes, mentor: Prof. Jean-Pierre Deprés) and a post-doc (Florida State University, host: Prof. Robert A. Holton) in the field of total synthesis of natural products, I became interested in organic synthesis methodology when I joined the group of Prof. Jean Rodriguez in Aix-Marseille University as a young CNRS researcher in 2003. In particular, I have contributed to the development of cascade reactions with stabilized carbanions and catalysis using both transition metal catalysis (coupling, isomerization, olefin metathesis, C-H activation) and enantioselective organocatalysis (aminocatalysis, bifunctional catalysis, catalysis with NHCs). Alongside this experimental work on organic synthesis methodology, I have gradually learned to use computational tools to model and study organic molecules, and I now have dual skills covering both experimental organic chemistry and theoretical physical organic chemistry. This has enabled me to acquire solid expertise in the reactivity and true nature of two families of short-lived molecules that are extremely useful in organic synthesis: the α -oxoketenes and the aryne.

Current research interests

In 2015, I was promoted as a CNRS Research Director, and since I carry out my research independently. Our group is most interested in the synthesis of (very!) twisted chiral polycyclic aromatic hydrocarbons (PAH) molecules by various methods, e.g., multihelicenes, and the examination of their properties. We are especially interested in the structural and the chiroptical properties of chiral PAH, their reactivity and/or their chemical modification by various approaches, and the relationship between their properties and their aromaticity (a chiral property!).

Selected recent publications

[Controllable 1,4-Palladium Aryl to Aryl Migration in Fused Systems Application to the Synthesis of Azaborole Multihelicenes](#). F. Full, A. Artigas, K. Wiegand, D. Volland, K. Szkodzińska, Y. Coquerel, A. Nowak-Król* *J. Am. Chem. Soc.* in press.

[Aromaticity in semi-condensed figure-eight molecules](#). A. Artigas, Y. Carissan, D. Hagebaum-Reignier, H. Bock, F. Durola*, Y. Coquerel* *Chem. Eur. J.* **2024**, e202401016.

[Helicene Aromaticity Deviates from the Clar Rule - On the Electronic Dissimilarity of Large Isomeric Fibonacenes](#). L. Sturm, A. Artigas*, Y. Coquerel*, I. H. Bechtold, F. Durola, H. Bock* *Angew. Chem. Int. Ed.* **2024**, e202403170.

[Conformational, Structural, and Chiroptical Properties of an Overcrowded Triply Fused Carbo\[7\]helicene](#). A. Artigas, N. Ferdi, M. Rémond, F. Rigoulet, N. Vanthuyne, D. Hagebaum-Reignier, Y. Carissan, J.-V. Naubron, M. Giorgi, L. Favereau*, Y. Coquerel* *J. Org. Chem.* **2024**, 89, 498–504.

[Oxidation of a triple carbo\[5\]helicene with hypervalent iodine](#). F. Rigoulet, A. Artigas, N. Ferdi, M. Giorgi, Y. Coquerel* *Org. Chem. Front.* **2023**, 10, 5902–5907.

[Overcrowded Triply Fused Carbo\[7\]helicene](#). A. Artigas*, F. Rigoulet, M. Giorgi, D. Hagebaum-Reignier, Y. Carissan, Y. Coquerel* *J. Am. Chem. Soc.* **2023**, 145, 15084–15087.

[A Triply \[5\]Helicene-Bridged \(1,3,5\)Cyclophane](#). F. Aribot, A. Merle, P. Dechambenoit, H. Bock, A. Artigas, N. Vanthuyne, Y. Carissan, D. Hagebaum-Reignier, Y. Coquerel*, F. Durola* *Angew. Chem. Int. Ed.* **2023**, 62, e202304058.

[Enantiospecific Syntheses of Congested Atropisomers through Chiral Bis\(aryne\) Synthetic Equivalents](#). G. Dauvergne, J.-V. Naubron, M. Giorgi, X. Bugaut, J. Rodriguez, Y. Carissan*, Y. Coquerel* *Chem. Eur. J.* **2022**, e202202473.

[Visualizing electron delocalization in contorted polycyclic aromatic hydrocarbons](#). A. Artigas, D. Hagebaum-Reignier, Y. Carissan*, Y. Coquerel* *Chem. Sci.* **2021**, 12, 13092–13100.

[Enantiospecific Generation and Trapping Reactions of Aryne Atropisomers](#). Y.-L. Wei, G. Dauvergne, J. Rodriguez*, Y. Coquerel* *J. Am. Chem. Soc.* **2020**, 142, 16921–16925.

[Stereoselective Syntheses, Structures, and Properties of Extremely Distorted Chiral Nanographenes Embedding Hextuple Helicenes](#). M. Roy, V. Berezhnaia, M. Villa, N. Vanthuyne, M. Giorgi, J.-V. Naubron, S.

Poyer, V. Monnier, L. Charles, Y. Carissan, D. Hagebaum-Reignier, J. Rodriguez, M. Gingras*, Y. Coquerel* *Angew. Chem. Int. Ed.* **2020**, *59*, 3264–3271.

[Cyclobishelicenes: shape-persistent figure-eight aromatic molecules with promising chiroptical properties.](#) A. Robert, G. Naulet, H. Bock, N. Vanthuyne, M. Jean, M. Giorgi, Y. Carissan, C. Aroulanda, A. Scalabre, E. Pouget, F. Durola*, Y. Coquerel*, *Chem. Eur. J.* **2019**, *25*, 14364–14369.

[Enantioselective Organocatalytic Four-Atom Ring Expansion of Cyclobutanones: Synthesis of Benzazocinones.](#) Y. Zhou, Y.-L. Wei, J. Rodriguez*, Y. Coquerel*, *Angew. Chem. Int. Ed.* **2019**, *58*, 456–460.

Supervision and dissemination of scientific culture

Mentoring or co-mentoring of 10 PhD students

Host or co-host PI for 11 post-doctoral research associates

Evaluation panel for 25 PhD theses (in France, Spain, Belgium, and India), and 5 HDR

Member of the SUD-PACA Regional Office of the French Chemical Society (2017–2021)

President of the SUD-PACA Regional Office of the French Chemical Society (since 2021)

Popularizing science for the general public (podcast & exhibitions since 2023)