

2023 Hans & Marlies Zimmer International Scholar



Professor Daniele Leonori

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Daniele obtained his PhD in organic chemistry at the University of Sheffield and then performed postdoctoral studies at RWTH Aachen University and the Max Planck Institute for Colloids and Interfaces. Daniele started his independent academic career at the University of Manchester in 2014 where he was promoted to Reader in 2018 and Professor in 2020. In 2022 Daniele and his group moved to the RWTH Aachen University, where he is a Chair of Organic Chemistry. Research in the Leonori group focuses on the development of novel methods exploiting the reactivity of radical and photoexcited species.

Zimmer International Scholar Lecture Tuesday, June 20; 2:30 PM; 502 Rieveschl

Novel synthetic methods using halogen-atom transfer and photoexcited nitroarenes

In this presentation I will discuss two recent research lines from my group focused on the development and understanding of halogen-atom transfer and excited nitroarene reactivity.

1) **Halogen-atom transfer (XAT).** Organic halides are valuable building blocks for the generation of alkyl and aryl radicals. However, their applications in photoredox catalysis can be difficult owing to their very negative reduction potentials. I will present our recent work focused on the use of α -aminoalkyl radicals as XAT mediators for the homolytic activation of alkyl iodides and bromides and their application in synthesis.^{1,2} Furthermore, I will discuss a non-canonical activation mode in XAT that eludes both kinetic and thermodynamic control.³

2) **Photoexcited nitroarenes.** Nitroaromatics are widely available feedstocks that are routinely used for the preparation of anilines. I will present our most recent work that demonstrates how these species can be used, upon blue light irradiation, to promote the ozonolysis-style cleave of olefins⁴ and also, in a skeletal editing logic, to allow preparation of complex and highly functionalized azepanes.⁵

References.

1. T. Constantin, M. Zanini, A. Regni, N. S. Shikh, F. Julia and D. Leonori *Science* 2020, *367*, 1021.
2. B. Gorski, A.-L. Barthelemy, J. J. Douglas, F. Julia and D. Leonori *Nat. Catal.* 2021, *4*, 623. *J. Am. Chem. Soc.* 2021, *143*, 14806.
3. T. Constantin, B. Gorski, M. Tilby, J. Llaveria, H. Zipse, S. Lakhdar and D. Leonori *Science* 2022, *377*, 1323..
4. A. Ruffoni, C. Hampton, M. Simonetti and D. Leonori *Nature* 2022, *610*, 81.
5. R. Mykura, R. Sanchez, V. Duong, J. Llaveria, A. Ruffoni and D. Leonori, *unpublished results*.