MARIE SKŁODOWSKA-CURIE INDIVIDUAL FELLOWSHIPS 2018

EXPRESSION OF INTEREST FOR HOSTING MARIE CURIE FELLOWS

HOST INSTITUTION

School of Sciences and Technology | LAQV@REQUIMTE Research Unit

RESEARCH GROUP AND URL

Organic Synthesis & Chemical Biology – MMMarques LAB
http://docentes.fct.unl.pt/msbm/

SUPERVISOR (NAME AND E-MAIL)

Maria Manuel Marques
mmbmarques@fct.unl.pt

SHORT CV OF THE SUPERVISOR

Maria Manuel Marques was born in Lisbon, Portugal. She studied chemistry at the New University of Lisbon, from where she also received her Ph.D. in organic chemistry in 2001 under the supervision of Prof. Dr. S. Prabhakar. From 2001 to 2003 she joined the group of Prof. Dr. J. Mulzer at the Institute of Organic Chemistry at the University of Vienna, as a postdoctoral research fellow. In 2003, she returned to the Faculty of Science and Technology, New University of Lisbon (Requimte) as a research fellow. Since 2004 she has been involved in organic chemistry teaching at the Chemistry Department. She has a large experience on supervising postdocs, PhD students and master students. In 2016 she obtained her Habilitation in Chemistry and in 2018 she became Assistant Professor at the Chemistry Department (New University of Lisbon). Her research encompasses the development of new synthetic and sustainable methodologies involving metal-catalyzed reactions towards bioactive compounds, in particular heterocyclic molecules, and the development of new synthetic strategies to prepare glycopeptides in order to understand biological systems.

SELECTED PUBLICATIONS

- One-Pot Synthesis of 1,2-Disubstituted 4 -, 5 -, 6 -, and 7 - Azaindoles from Amino -o- halopyridines via N - Arylation/Sonogashira/Cyclization Reaction; Purificação S. I., Pires M. J. D., Rafael R., Santos A. Sofia, Marques M. M. B.* Org. Lett. 2017, 19, 5118–5121. DOI: 10.1021/acs.orglett.7b02403;

- Synthesis of Substituted 4-, 5-, 6-, and 7-Azaindoles from Aminopyridines via a Cascade C-N Cross-Coupling/Heck Reaction; Pires M. J. D., Poeira D. L., Purificação S. I., Marques M. M. B.* Org. Lett. 2016, 18, 3250–3253. DOI: 10.1021/acs.orglett.6b01500;

- Metal-Catalyzed Cross-Coupling Reactions of Aminopyridines; Pires M. J. D., Poeira D. L., Marques M. M. B.* Eur. J. Org. Chem. 2015, 33, 7197–7234. DOI: 10.1002/ejoc.201500952;

- Synthesis and Evaluation of new Benzimidazole-Based COX Inhibitors: a Naproxen-like Interaction Detected by STD-NMR; Carvalho L. C. R., Ribeiro D., Seixas R. S. G. R., Silva A. M. S., Nave M., Martins A.

C., Erhardt S., Fernandes E., Cabrita E. J., Marques M. M. B.* RSC Adv. 2015, 5, 49098–149109. DOI: 10.1039/c5ra04984a;

- Pd-catalysed Amination on a Soluble Polymer Support: Arylation of Anilines with PEG-supported Aryl Halides; Carvalho L. C., Pires M. J. D., Marques M. M. B.* RSC Adv. 2013, 3, 25711–25715. DOI: 10.1039/C3RA45177A.

PROJECT TITLE AND DESCRIPTION

Advancing Structural Diversity of N-containing Heterocycles via Novel Metal-catalyzed Reactions

In this project innovative methodologies will be explored to prepare heterocyclic compounds that will constitute on atom-efficient strategies in order to improve access to biologically relevant scaffolds, overcoming limitations of previous approaches while simultaneously establishing difficult functionalization on these moieties. These advances will undoubtedly impact medicinal chemistry and the pharmaceutical industry.
N-containing heterocyclic compounds, in particular indoles and azaindoles, the indole bioisosteres, are considered as privileged structures with exceptional physicochemical, pharmacological properties and are present in many bioactive compounds. Indeed, azaindoles are remarkable in terms of drug optimization strategies. However, azaindoles are challenging scaffolds due to the electron-deficient nature of the pyridine ring, that alters the electronic properties of the conjugated system and consequently many classic indole synthetic methods are not as efficient or simply do not work. The aim of the project is to develop practical metal catalyzed approaches for a straightforward synthesis of substituted N-containing heterocycles. The methodologies to be developed will involve combination of different metal-catalyzed cross-coupling reactions and annulation reactions. Due to the enormous gain in molecular complexity, these approaches will serve as powerful tool for organic synthesis.
Despite the great progress on N-containing heterocycles synthesis, there is room for improvement, in particular development of procedures towards diversely substituted scaffolds with simple isolation methods. Recently, azaindoles have generated significant interest as both synthetic targets and key structural components of therapeutic agents. Furthermore, the methodologies developed will be applied to other heterocyclic structures. The compounds generated will be used on ongoing collaborative projects envisaging the design oriented synthesis of small molecules library as inhibitors of key enzymes involved in the inflammatory process.

SCIENTIFIC AREA WHERE THE PROJECT FITS BEST

Chemistry (CHE)

OTHER RELEVANT INFORMATION

The candidates should have a solid experience on the synthesis of diverse chemical classes of compounds, demonstrate ability to work successfully and willing to participate in supervising and mentoring activities. The candidate should have excellent presentation, writing and communication skills. Mobility will be appreciated. Candidates should send by email to Prof. Maria Manuel B. Marques (mmbmarques@fct.unl.pt) the following documents:
-Curriculum Vitae
-Brief description of the candidate's previous experience and expertise he/she would bring to the institution
-A motivation letter (1 page)
- Contact information of two referees