



### Supervisor's evaluation and report on PhD Thesis

Author: Miguel Alexandre Gomes Mateus, M.Sc.

Miguel Mateus wrote a dissertation thesis entitled "Synthesis and Application of Transition Metal Complexes Bearing N-Heterocyclic Carbene Ligands." I first met Miguel when I was still a postdoc in Professor Martin Kotora's group, where Miguel was an Erasmus student. I had the pleasure of supervising him during his Erasmus stay, and when he learned that I was about to start my independent group, he expressed interest in joining as a PhD student. I agreed, and it turned out to be a good decision.

Miguel began working on catalyst development, focusing on organometallic chemistry—a new area for both of us, requiring us to learn many new things along the way. He quickly succeeded in isolating interesting silver complexes and started exploring their potential in several directions, including their use as antimicrobial agents, carbene transfer reagents, and catalysts. Miguel discovered that these complexes performed well in all these directions: they exhibited efficient antimicrobial properties, he developed a transmetalation protocol for the synthesis of other metal complexes (palladium and nickel) with helical chirality—further investigating trends in their conformational behavior—and successfully applied the silver complexes as catalysts in multicomponent catalytic A3 and KA2 couplings. He further explored the products of the multicomponent coupling for data storing purposes.

Miguel has been an exemplary lab manager, consistently maintaining a clean and organized workspace that supported efficient and safe research environment. He effectively supervised undergraduate and master's students, providing guidance and setting a strong example for them. His leadership and mentorship have significantly contributed to the positive and productive environment in our lab. Miguel is confident in his opinions and approaches, which can be often beneficial. However, for me as the supervisor, it hasn't always been easy to persuade him to consider alternative ways that I believed were the best. I have one critical note. I noticed that when it came to exploring new techniques he was unfamiliar with, there was sometimes a hesitation to use them. For his own benefit, I would advise him to push past the discomfort of stepping into uncharted waters.

Miguel's work so far yielded two first authorship publications (*Appl. Organomet. Chem.* and *ChemPlusChem*) as well as two other publications, unrelated to his thesis, where his contribution resulted into a co-authorship (*Eur. J. Org. Chem., Catalysts*). This together with the paper resulting from his master's work (*Org. Lett.*) provides a nice portfolio of publications. Moreover, some of the work, that has been practically finished has not been published so far, and Miguel will definitely be part of the authorship list. It is noteworthy to mention, that Miguel presented his work in a form of a poster or oral communications at many national or international conferences.

For all his achievements and performance, it is my pleasure to recommend his thesis for defense and further proceeding for obtaining the doctoral degree.

In Prague, 2. 9. 2024

Dr. Lukáš Rýček, M.Sc.