

Mac Robertson Postgraduate Travel Scholarship Report

About me

My name is Fáinché Murphy and I am from Armagh, Northern Ireland. I am currently in my second year of PhD study in the department of Pure and Applied Chemistry, University of Strathclyde. My research, supervised by Dr Catherine Weetman, focusses on the design and development of new catalysts containing main group elements.

In my first year of study, I was awarded the Mac Robertson Postgraduate Travel Scholarship (£4,000) enabling me to carry out a research stay in Oldenburg, Germany.



Figure 1. Me at part of the Berlin wall (November 2022).

Why did I apply for the Travel Scholarship?

I applied as the Mac Robertson Travel Scholarship would further strengthen a new collaboration between the Müller/Albers and Weetman groups. The visit would also provide me with first-hand experience of Müller and Albers' expertise in their research areas alongside access to their resources.

Currently, my research centres around the development of novel low oxidation state aluminium catalysts. At present, organoaluminium compounds are widely used in industrial and synthetic chemistry due to the metal's high natural abundance, low cost, and low toxicity, making it an ideal candidate for the development of sustainable methodologies. However, the development of low oxidation state aluminium chemistry is still in its infancy with many questions still to be answered in this field. Therefore, by developing the theoretical aspects of my research in Oldenburg, we would be able to understand structure-activity relationships in homogeneous catalysis which would be highly beneficial for the future of my research.

Details of the visit.

In early September 2022 I travelled to the Carl von Ossietzky (CvO) University of Oldenburg, Germany, where I would carry out research from September to November 2022. I was warmly welcomed into the group of Prof. T. Müller and Dr L. Albers by Lukas Bührmann, who had previously been with us in Glasgow for a 3-month research stay from May to July 2022.



Figure 2. View from Wechloy campus main entrance.



Figure 3. Late autumn walk back to the guesthouse.

The opportunity to work with Prof. T. Müller and Dr L. Albers was highly beneficial to my current PhD research. Specifically, the group are interested in developing main group compounds with unusual bonding situations while using theory to support and guide their experimental work. Their detailed knowledge of the application of quantum mechanical calculations for the understanding of the electronic nature of new molecules and for the investigations of reactions mechanisms is a great benefit for my current research project. Therefore, it was the main aim of my research stay to learn how to perform and interpret such calculations as well as utilising their high-tech facilities to support my recent findings.

During my first weeks I settled into German life and adapted to the new laboratory surroundings. I carried out a lot of laboratory work to complete much needed analysis of my own compounds that I had previously developed in Glasgow. Throughout my time I learned so much about computational calculations and how to perform them correctly thanks to Dr L. Albers and Prof. T. Müller.

In the last month of my time in Oldenburg I began to experiment with the group's own chemistry combined with my own, which has shown promise for the future. As such, this collaboration is being carried on past this research stay with contributions from both Glasgow and Oldenburg. In addition to practical and theoretical work, I had the opportunity to present my research in a group seminar and attended the departmental colloquia programme.



Figure 4. Some air/moisture sensitive experiments.



Figure 5. Lukas and I in our lab.

On weekends I had the opportunity to travel and take in the culture while putting the little German I had learned to the test. I visited Hamburg, Berlin, Bremen and Norderney (an island in the North Sea). These trips are experiences that I will never forget.

Norderney (October 2022):



Figure 6. Views of North Sea.



Figure 7. Original thatched windmill as a cafe.



Figure 8. German East Frisian Tea Ceremony.

Hamburg (November 2022):



Figure 9. Views of the steeples across the Alster.



Figure 10. Some photos of Miniatur Wunderland, Hamburg.

Berlin (November 2022):



Figure 11. Brandenburg Gate.



Figure 12. Me at Check-Point Charlie.



Figure 13. Snowy view from the TV Tower.

Impact of the Travel Scholarship

The Mac Robertson Travel Scholarship provided me with the opportunity to broaden my chemistry knowledge and build a new network of international contacts. The work that I carried out has opened new doors to collaborations between Glasgow and Oldenburg.

Personally, experiencing life in a different culture where English wasn't the first language had a huge impact on me and I am so glad I did it. I have made many new friends that I hope to stay in touch with in the future.

Acknowledgements

Firstly, I would like to thank the Mac Robertson Trust for the opportunity. I would also like to thank Prof. T. Müller and Dr L. Albers for welcoming me into the group and for the guidance they provided during my stay. Moreover, I would like to thank my supervisor Dr C. Weetman for the encouragement and support throughout the process. In addition, I would like to thank the extended Müller working group for their technical support. And finally, a special thanks to the group members, Lukas Bührmann, Marie Würdemann, Nadeschda Geibel, Cheng-Huan Liu and Corinna Girschik, for the coffee and laughs everyday making it a brilliant place to work.



Figure 14. The group at the Kramermarkt, Oldenburg.