

Mac Robertson Travelling Scholarship Report

About me

My name is Magdalena Lesniewska and I am currently a final year PhD student at the University of Strathclyde. My doctoral research is focused on simulations of liquid crystal composite materials in microfluidic channels. I am especially interested in dynamic systems of passive nematics, colloid induced topologies, and colloid interactions. I was awarded the Mac Robertson Travelling Scholarship in 2020 for a 3-month research visit to the University of Ljubljana in Slovenia which I was able to conduct in spring of 2022.



Fig1. A photo next to my favourite building in Ljubljana and a view of the vernacular going to the castle.

Why did I apply for the travel scholarship?

I applied for the travel scholarship to foster a collaboration with an experimental group in my field as my work focuses on simulations and theory. Slovenia is internationally well known for liquid crystal research and through one of my supervisors I was able to get in touch with Dr Uroš Tkalec at the University of Ljubljana and see if our research was similar in nature. After some discussion we found very closely linked areas of interest in colloidal particles in liquid crystal microfluidic channels and made a proposal for a research visit that would allow us to collaborate in person and combine the simulation capabilities on our end with the experimental expertise of Dr Tkalec.

Details of the visit

Unfortunately after arriving in Ljubljana I contracted covid-19 within the first couple of days and needed to self-isolate for almost 2 weeks. The bad luck didn't finish there, as the day before a planned meeting with the PhD student who was meant to be showing me the laboratories and how the experiments are conducted also contracted covid-19 and was out of commission for the next two weeks. Thankfully after we dealt with those hurdles, we managed to conduct the planned experiments and confirm some of our simulations and particle behaviour.

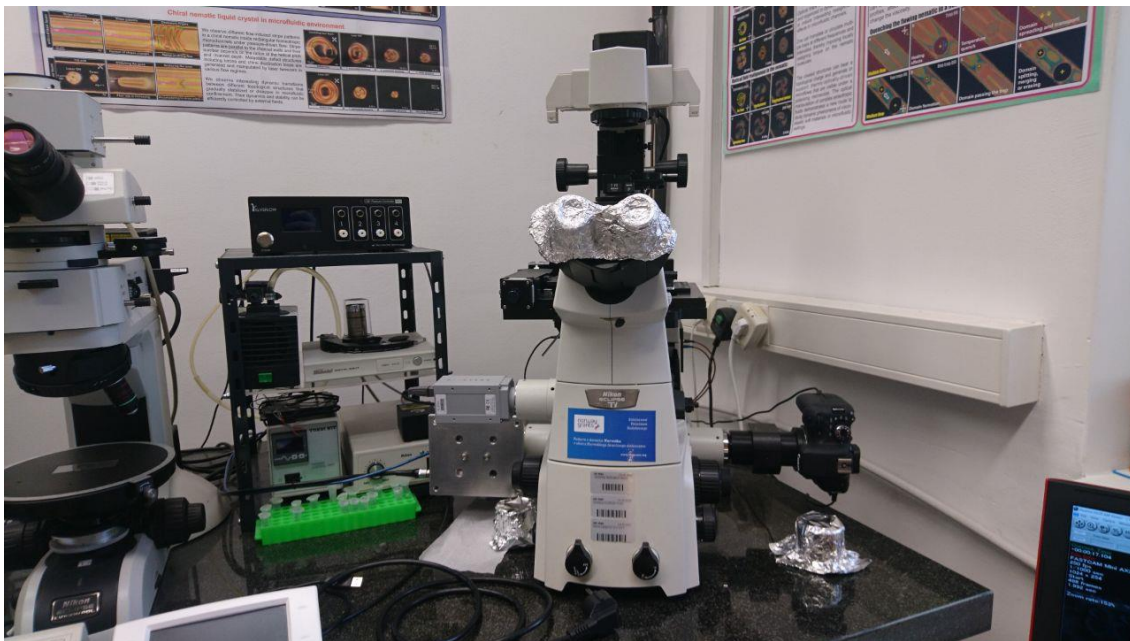


Fig2. The experimental set up used to conduct the microfluidic flow experiments

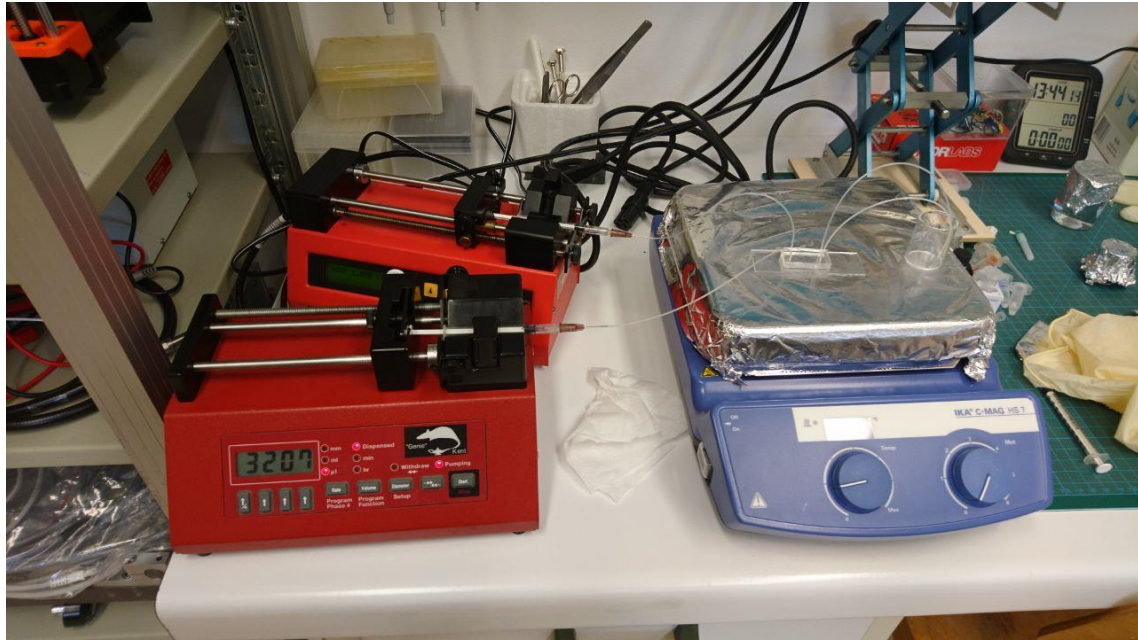


Fig3. Preparation of the channels to be used in the experiments

Through further discussions we were able to work out what is possible experimentally and also discuss the capabilities of our simulations and having done the experiments we're looking at simulating new phenomena that were exhibited experimentally. Overall, it was a great visit and I believe we have fostered a lasting research collaboration with our research groups. In addition, I got to meet more people in my area of research and presented what I was working on to the different groups in Slovenia and had a very constructive visit at another research group where I meet people in the field I've only ever read papers of, so it was great to actually have a conversation with them and chat about what they've done. I had a good time working on the simulations and experiments, I also got to see more of the country, having never been to that corner of Europe before.

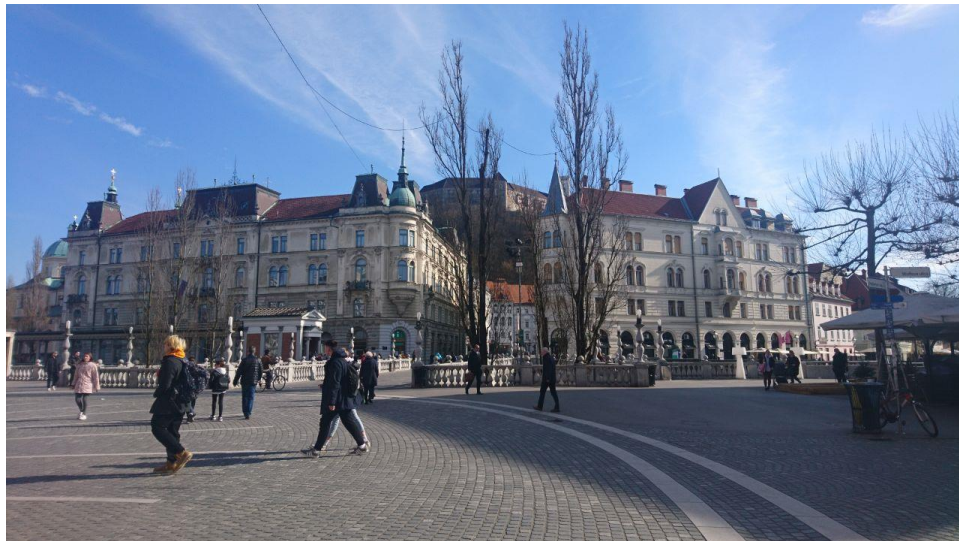


Fig4. View of central Ljubljana



Fig5. A beautiful view of some of the lower mountains during a trip to the countryside

Impact of the travel scholarship

This scholarship was a very productive trip that resulted in an ongoing collaboration between two research groups that compliment each others' specialties very well - combining excellent experimentalists and robust simulation specialists to create cutting-edge science with good theoretical understanding backed up by experimental confirmation. This has resulted in a published paper (DOI: 10.1039/d2sm00707j) with more publications being worked on.

Acknowledgements

I would like to thank Dr Uroš Tkalec and the entire department for welcoming me to Slovenia and supporting me with guidance and advice throughout the entire trip. I'd like to thank Rok Štanc for showing me all his experimental expertise, Simon Čopar for preparing the best in-person visit and introducing me to all of the group members and really going above and beyond. A special thanks goes to the local bakery and grocery shop ladies who put up with my broken attempts at Slovenian for all of those months.