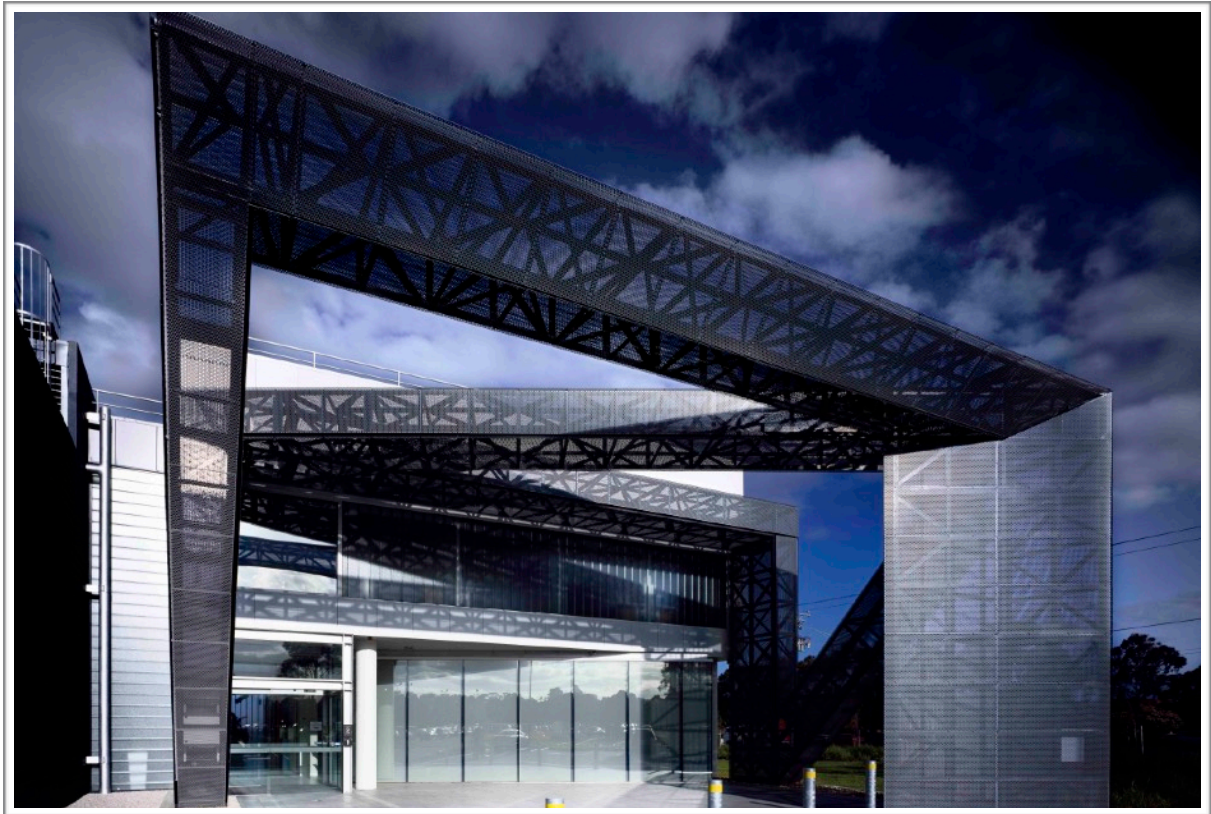


# Long-term research stay at the Melbourne Centre for Nanofabrication



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## Introduction

This long-term research stay of 6 months at the Melbourne Centre for Nanofabrication (MCN) fostered the collaboration between Prof. Tobias Kraus (Leibniz Institute for New Materials, INM) and Prof. Nicolas Voelcker (Monash University, MCN and CSIRO). The project aims at integrating optically-active gold nanoparticles into porous silicon microdiscs for cancer therapy. The latter requires a combination of electrochemical etching of silicon wafers and top-down fabrication techniques. The MCN offers both cleanroom fabrication facilities and a dedicated etching laboratory, making it adequate for the fabrication of porous silicon microdiscs.

## Expectations

The goal was to establish a new fabrication process at the MCN to produce porous silicon microdiscs, learn about electrochemical etching and develop my experience in optical lithography fabrication. While the fabrication process proved to be more challenging than expected, the expectations were fulfilled thanks to the help of Prof. Voelcker's group members and also the expertise of the MCN instrument managers. After fine-tuning the different fabrication parameters, we managed to upscale the fabrication so I could bring back enough samples to continue the experimental work at the INM. I also gained new know-how and was very pleased to strengthen my cleanroom fabrication skills

## Work environment

I became familiar with the MCN work environment during my PhD that I did a few years ago over there and briefly met Prof. Voelcker's group in Adelaide in 2016. Hence, it was easier for me to adapt to this work environment.

For the cleanroom fabrication, the MCN staff was very helpful and guided me through every induction, training and fabrication step. Despite their busy schedules, members of Prof. Voelcker's group made time to answer many of my questions regarding the electrochemical etching of silicon, which was new to me.

## Differences between working in Australia and in Germany

The main difference is the lack of laboratory support in Australia. In our group at the INM, we have a lab technician who takes care of ordering, supplies, basic experimental syntheses and analytical measurements. In Australia, all lab duties are usually managed by the students and postdocs making their schedule much busier. This could have an impact on how the laboratories are maintained and organised and the time people have to help you in your project.

Another difference is the time required to order special chemicals in Australia. Each group has their own system for ordering, they need to file some paperwork for the ordering office of the university and the delivery time could be sometimes long if the chemical is not stocked in Australia. Any chemical ordering should be organised to the research stay.

Australian universities are very focused on work safety. Be aware that at the beginning, you will have to spend a considerable amount of time for safety, lab inductions and trainings. This should also be arranged prior to arrival to avoid waiting too long for the next training. In the same context, there is a lot of paperwork regarding access to instruments, labs after business-hours and laboratories outside of the hosting group departmental affiliations. Make sure to identify if you need special access and arrange it before departure.

In conclusion, everything takes longer because of the size of these universities and their emphasis on work safety.

## Things to know before the trip

Living costs in Australia are higher than in Germany, especially the rent. Finding a place to stay is a bit tricky. Ask your host's group if they have any spare room or if they know someone. Universities sometimes have guests houses. You can look online for flatshare and houseshare on websites such as [gumtree.com.au](http://gumtree.com.au) or [flatmates.com.au](http://flatmates.com.au) or any real estate websites. I would recommend to make a list of interesting places you would like to visit, contact them, book a hostel/hotel/air bnb for your first week and visit the places during that first week. Air BnB is of course an option but more expensive. They do offer discounts for long term stay.

There is no canteen systems like Mensa, you either need to bring your own lunch or to buy it outside, which can make your daily expenses go up rapidly.

If you go to Melbourne in winter, pack accordingly your suitcase. Most people think that because this is Australia, it will not be cold but it can get very chilly with frost in the mornings and houses are poorly insulated.

The Australian accent could be a bit difficult at first and it is not the easiest accent but after a while, you will get used to it. Watching Australian movies or tv shows could help to prepare for it.

Public transports are generally not well developed in Australia and distances are big. Therefore, if you plan on travelling in the country, get an international driving license. Driving on the other side of the road is not as difficult as it seems. In Melbourne, it can be time-consuming to use trains/buses to go around.

VISA applications can be troublesome, take the time to prepare it.

## Why Melbourne? What leisure?

Melbourne is a science hub with world-ranked universities. Ideal to network and to meet new researchers to create collaborations. People are usually easy-going and friendly and organise after-work activities. Melbourne is a cosmopolitan city meaning you will meet people from different countries. You will see this cultural diversity in the vibrant restaurant scene of Melbourne with authentic asian food or delicious Italian pizzas. Night life is also a highlight of this city with many hidden and rooftop bars. The Victoria region has several wine regions not too far from Melbourne (~2 hours drive). The wildlife is fantastic, even in the city but parks and reserves are also very close to the city if you want to spot colourful birds or hopping kangaroos. Victoria offers beautiful hiking spots (Grampians or Wilsons Promontory), swimming beaches on the Mornington Peninsula and great surfing (even for beginners) around Torquay, headquarters of Quiksilver and Rip Curl with the famous Bells Beach.