

Final report

Internship abroad

Subject of studies: PhD in Clinical and Experimental Reproductive Biology

Bachelor/Master/State exam: PhD

Time of internship: 22.08.2025 – 27.10.2025

Place of internship: Toronto, Ontario, Canada

Internship institution: Toronto Zoo

I am currently a PhD student in the Life Sciences Munich (LSM) program, working in the Faculty of Veterinary Medicine at LMU Munich. My project focuses on developing fluidic models to improve assisted reproductive technologies (ARTs) for both fundamental research and practical applications. The systems we develop are designed to mimic the microenvironment of reproductive tissues, aiming to improve oocyte maturation, sperm selection and embryo culture. Beyond their use in clinical reproductive biology, these models can also serve as valuable tools in conservation programs for endangered species, where access to live reproductive material is often extremely limited. In Munich, most of our experiments have been performed using slaughterhouse-derived bovine material, which provided a good model for testing our systems. However, to further demonstrate their versatility and efficiency, we wanted to extend our studies to include reproductive materials from wildlife species. This became the motivation for organizing an internship abroad, where I could collaborate with a team that had access to such materials and experience with reproductive work in wild and endangered animals.

Through my supervisor at LMU, MF, I learned about the reproductive science team at the Toronto Zoo, which runs several projects on wildlife reproduction and gamete preservation. After a few online meetings with the Head of Reproductive Research, GM, and discussing possible collaborations, we designed a two-month research project focusing on applying my microfluidic systems to bison gametes. The opportunity aligned perfectly with the goals of my PhD project, allowing me to test my devices in a completely new setting.

The administrative preparation for my internship went surprisingly smoothly. Since I am a European citizen and was not planning to stay longer than six months in Canada, I did not need to apply for a visa. Instead, I only had to complete an electronic travel authorization (eTA), an online application where I provided my passport and contact information. The process was straightforward and cost 79 USD. A few days later, I received an email confirming my approval, and I was ready to book my flight.

Finding accommodation took a bit more time. My colleague—and sister—YF, who is also doing her PhD in Munich, had already arranged a six-month internship at the Toronto Zoo starting in May 2025. It made sense for us to share accommodation, so we started looking for a place together. We used housing platforms such as roomies.ca and kijiji.ca to find a house near the Zoo. After about two weeks of searching, we found a comfortable house in the Scarborough area, which is where the Zoo is located. We rented two separate rooms in a shared house with two other female tenants, sharing the kitchen and bathroom. Each of us paid 850 CAD per month, which we found quite reasonable compared to housing prices in downtown Toronto, where similar rooms can cost between 1000 and 1500 CAD. Staying close to the Zoo was practical, as it saved us both time and money on transportation.

Although we could reach the Zoo by public transport, commuting was somewhat inconvenient. Despite the short distance—just six minutes by car—it took around 30 to 45 minutes by bus due to the lack of direct routes. Toronto’s public transport system operates through the Presto app, which allows users to plan routes and pay for trips directly. Each ride cost 3.30 CAD, which can add up quickly when traveling daily. On some days, the technicians or post-docs at the Zoo were kind enough to offer us a ride home after work, which we really appreciated. Traveling to Toronto city center took longer, about 45 minutes by a combination of bus and train, but it was worth the effort for the variety of restaurants, cultural events, and vibrant neighborhoods. I quickly realized that distances in Canada are much greater than in Germany or Europe in general, and that having access to a car makes life much easier, especially for exploring nature or running errands.

During my stay, I was able to explore different areas of Toronto and beyond. One of my favorite spots was Korea Town, where we discovered a range of Asian restaurants, small grocery shops, and karaoke bars. I really enjoyed the multicultural atmosphere of Toronto—people from all over the world live together, and this diversity is reflected in the city’s food, language, and cultural life. As someone who enjoys trying new dishes and learning about other cultures, I found this aspect particularly enriching. Outside of work, I made friends from

different backgrounds, and together we explored many places around Toronto, such as Niagara Falls, nearby orchards for apple picking, and the beautiful lakes surrounding the city. Watching the autumn colors gradually appear on the trees was breathtaking, and I often took walks in the Rouge National Urban Park, which was only a short walk from our home. These quiet walks after work became an important part of my daily routine and a way to unwind after long lab days.

As an intern working at the Zoo, I also had the privilege of visiting the zoo facilities for free and could bring two guests with me. During one weekend, my friends and I spent a full day exploring the Zoo. Seeing the animals and learning about the conservation programs from a behind-the-scenes perspective was a unique experience. It was particularly rewarding to show my friends the research environment where I worked and explain how reproductive technologies can play a role in conservation efforts.

My project at the Zoo focused on adapting the microfluidic devices developed in Munich to test their use with bison oocytes and sperm. The goal was to evaluate how well our systems functioned with reproductive material from a non-domestic species. The first week was primarily dedicated to orientation and training sessions, including safety regulations, animal welfare, and sensitivity training—standard for all researchers working in close proximity to animals. I found it very interesting to observe how procedures differed between the Zoo and a European university. Since the Toronto Zoo is a partly government-funded institution, there are strict policies regarding animal handling, ethics, and sample collection. Learning about these regulations helped me understand the practical and ethical challenges involved in working with wildlife.

Obtaining the biological material was one of the main logistical challenges of the project. Since bison are not commonly farmed around Toronto, we initially struggled to find suitable sources for samples. Eventually, we coordinated a trip to British Columbia, where my Munich supervisor now resides, and visited a bison slaughterhouse near Calgary to collect the necessary material. This experience was eye-opening; it allowed me to observe Canadian slaughterhouse procedures, which differ significantly from European practices, and meet veterinarians involved. Later, we also performed collections from live bison at the Zoo. For these, another research team from Saskatchewan joined us to synchronize the reproductive cycles of the female animals—a necessary step for obtaining viable samples. This collaboration was highly enriching and led to interesting discussions about how our microfluidic devices could contribute to improving ARTs in bison. We even gave a short

presentation to the visiting researchers about our work in Munich, which opened the door to potential future collaborations.

The reproductive science department at the Zoo was a relatively small but very dynamic team consisting of four post-docs, two senior technicians, two junior technicians, and the head of the department. During my stay, I shared an office with the post-docs, all of whom were extremely supportive and welcoming. We usually had lunch together in the staff cafeteria, and these breaks became a great opportunity to learn about each other's work and exchange experiences. The daily schedule was quite structured—most people arrived around 8:30 a.m. and left around 5 p.m. As visiting students, we were required to leave the lab at the same time, which provided a healthy balance between work and leisure. The technicians were always ready to help us prepare our experiments, and I had the chance to observe and learn several new laboratory techniques that I had not encountered before.

One of the most memorable parts of my internship was participating in the animal procedures, such as sperm collection from male bison and the preparation of females for artificial insemination. Being directly involved in these activities gave me a deeper appreciation of the practical side of reproductive science and allowed me to see how the systems I had been developing for years could be applied in real-life conservation contexts. I also had the chance to interact closely with zoo veterinarians and animal caretakers, who were incredibly knowledgeable and passionate about their work. I was impressed by the strong bond between the staff and the animals, and by how much care and respect they showed toward each individual animal. Seeing how each animal had a distinct personality and how carefully their welfare was considered was both moving and inspiring.

Financially, my stay was manageable but required careful planning. Toronto is an expensive city, especially for food and transportation. Groceries cost slightly more than in Germany, and dining out is generally pricey. However, we found ways to save money by cooking at home and shopping in local Asian or Indian supermarkets, which often offered better prices than large chains. Public transportation was affordable for daily commuting, and most social activities, such as hiking or visiting parks, were low-cost. Overall, the expenses were justified by the invaluable experience and the quality of life in such a welcoming and vibrant city.

Reflecting on my internship, I can say that it exceeded my expectations in every possible way. I not only learned a great deal about wildlife reproductive science but also gained a broader understanding of how research is conducted in a non-academic setting. It was a unique

opportunity to see how scientific findings are directly applied to conservation programs. The experience also strengthened my motivation for continuing in research and possibly working at the interface between academic research and field applications in the future. The combination of hands-on animal work, lab experiments, and international collaboration made this internship one of the most formative experiences of my PhD.

If I were to give advice to future interns, I would recommend starting preparations early, especially when it comes to accommodation and transportation. Staying near the Zoo was very convenient, and having access to a car, if possible, makes a significant difference. I would also suggest taking the time to explore Toronto and its surroundings—it is an incredibly diverse and lively city that offers much more than just work opportunities. Most importantly, being open, proactive, and ready to adapt to new working cultures can make the experience even more rewarding. Overall, my internship at the Toronto Zoo was an unforgettable experience that deepened my scientific knowledge, broadened my cultural perspective, and reaffirmed my enthusiasm for research in reproductive biology and conservation.