

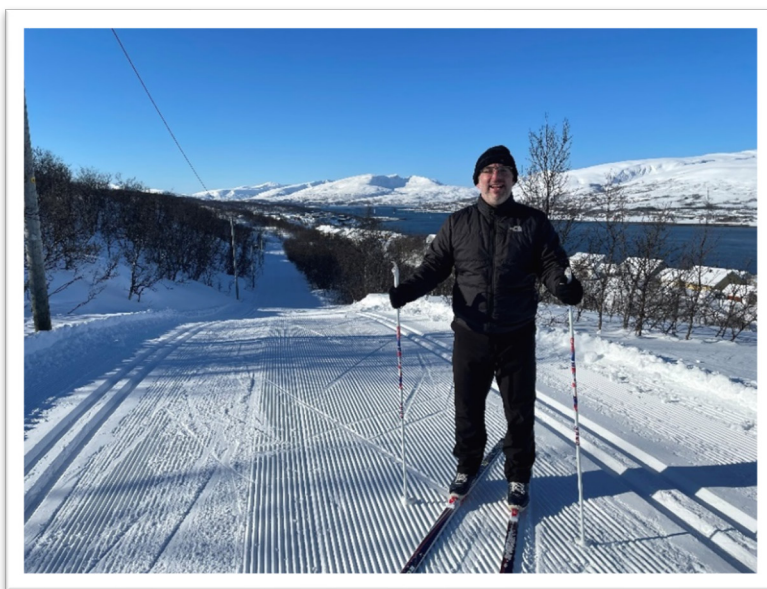
Report on Scientific Visit to the Mathematical Department of the Arctic University of Norway

I am pleased to present my report on my recent scientific visit to the Arctic University of Norway. The visit was highly successful, and I had the opportunity to collaborate with local mathematicians, give a series of lectures, and engage in various sport activities.

As part of my visit, I was invited to give a series of three lectures mainly centered around the **local differential invariants of submanifolds Σ in homogeneous spaces G/H , comparing the viewpoints of Sophus Lie and Elie Cartan**. We explored the historical development of these ideas and their modern interpretations. We discussed the role of symmetry in the study of differential equations and the connection between invariants and geometric structures. The lectures generated a lot of interest from the participants, who actively participated in the question-and-answer sessions that followed each lecture.

During my visit, I had the opportunity to collaborate with Boris Kruglikov and Dennis The from the Mathematical Department of the UiT. We discussed **representation-based approach to bound dimensions of the solution spaces of curved BGG operators through the deformation theory, Lie algebra cohomology $H^2(\mathfrak{g}, V)$ for a representation V of $\mathfrak{g} = \text{Lie}(G)$ and generalizations of the Tanaka prolongation**. Applications involve Killing tensors, Einstein scales, degree of mobility, etc. Throughout our discussions, we engaged in an active exchange of ideas, and I found the experience to be highly enriching. This initiated a collaboration, which we are going to develop further in the near future. The discussions also provided me with valuable feedback on my research, which will undoubtedly be helpful in my future work. Overall, the scientific collaboration during my visit to the Arctic University of Norway was a highlight of my experience, and I look forward to the possibility of collaborating with the local academic community in the future.

During my stay, I also had a chance to do some sports. I particularly enjoyed playing pickleball, a paddleball sport that was brought to Tromsø by my colleague mathematician Dennis The. Despite my lack of experience, I found it to be an excellent way to unwind after a day of lectures and collaboration. Additionally, I had a chance to try cross-country skiing, which was a unique experience. The snow-covered landscape provided a picturesque setting for this winter sport, and I enjoyed the physical activity and the fresh air.



Overall, my scientific visit to the University of Tromsø was a highly productive and enjoyable experience. I was able to collaborate with local mathematicians, present my research, and participate in social activities. The hospitality and warmth of the people in Tromsø made the visit even more pleasant. I look forward to the possibility of returning to Tromsø in the future and continuing my collaboration with the local academic community.