# REPORT ON MY LEIBNIZ FELLOWSHIP

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This is a report on my stay as a Leibniz fellow at Mathematisches Forschungsinstitut for two months during November-December 2011 and April-May 2012.

My stay allowed me to participate in the Affine Algebraic Geometry Seminar in November 2011 and in the Toric Geometry meeting in the third week of April in 2012. I greatly benefitted from the Affine Algebraic Geometry seminar not only by the great lectures but also by the opportunity to meet people working in this area. I had fruitful discussions with Adrien Dubouloz who was an organiser of the affine geometry seminar and we were able to formulate a project to work on. I also benefitted from some lectures in the Oberwolfach seminar on CM modules, surface singularities and McKay correspondence and from the Toric Geometry meeting in April.

In the second week of April I was able to make a research visit to Adrien Dubouloz at Dijon, France.

My main focus during the fellowship has been on two problems. The first is to characterize the complements of multi-sections on Hirzebruch surfaces. This is motivated from a surprising theorem of Danilov-Gizatullin that the isomorphism class of the complement of an ample section on a Hirzebruch surface depends only on the self-intersection of the section. Our interest was to explore if the complements of multi-sections also enjoy this property and also because the complements of triple or higher sections would give rise to log general type affine surfaces whose properties could be better understood, being embedded in a Hirzebruch surface. In a joint work with Adrien Dubouloz we obtain a classification of the complements of multi-sections of Hirzebruch surfaces.

The second problem that I worked on during my stay was to study normal hypersurfaces in $\mathbb{P}^3$ with smooth locus of non-general type in the sense of logarithmic Kodaira dimension. I have obtained some partial results in the negative log Kodaira dimension case which limits the kind of singularities these surfaces can have.

My time in the institute as a Leibniz fellow has been an inspiring and enriching experience for me. Apart from my planned work I was able to sort out my thoughts and see a much clearer path for future work entirely due to the sereneness of the institute.

I cannot praise the library enough or the excellent staff who took such good care or the delightful food. I have very much enjoyed my stay at Oberwolfach and I hope to be able to return.