

Research project **LBH**
Lower bounds for heights

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Research project short description:

The subject of this PhD project will be canonical heights on low genus curves and their moduli spaces. One topic to be addressed is the Lang-Silverman conjecture on lower bounds for canonical heights of non-torsion rational points on abelian varieties over number fields. Recent results towards this conjecture in the case of abelian surfaces can be found in [Pa]. This involves a study of local canonical heights using results of Flynn, Smart and Stoll. It would be interesting to make a comparison with the local canonical heights defined in [dJ]. An influential paper on the case of elliptic curves has been [HS]. It would be interesting to see to what extent the ideas, methods and techniques from this paper can be applied to the abelian surface case. Finally it would be interesting to see how the Lang-Silverman conjectures are related for three curves E_1 , E_2 and C where C is of genus two and E_1 , E_2 are elliptic, such that the jacobian of C is isogenous to the product $E_1 \times E_2$. This issue is inspired by the paper [FK].

References:

- [FK] G. Frey and E. Kani, Curves of genus 2 covering elliptic curves and an arithmetical application. Arithmetic algebraic geometry (Texel, 1989), 153–176, Progr. Math., 89, Birkhäuser Boston, Boston, MA, 1991.
- [dJ] R. de Jong, Canonical heights and logarithmic equidistribution on superelliptic curves. Preprint [arxiv:0911.1271](https://arxiv.org/abs/0911.1271).
- [HS] M. Hindry and J.H. Silverman, The canonical height and integral points on elliptic curves. Invent. Math. 93 (1988), no. 2, 419–450.
- [Pa] F. Pazuki, Minoration de la hauteur de Néron-Tate sur les surfaces abéliennes. Preprint [arxiv:0812.2854](https://arxiv.org/abs/0812.2854).