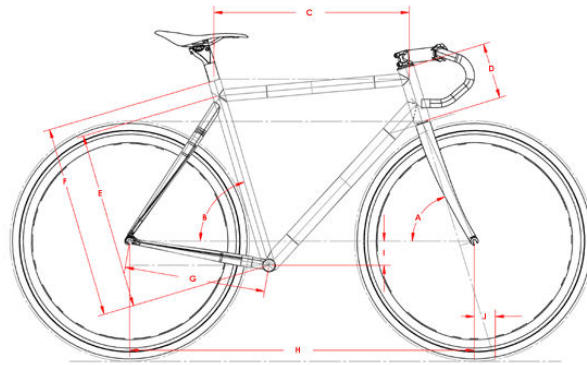


## MSc project

# Bicycle Geometry, Dynamics, and Handling;

why do some bicycles feel different than others?



Why do some bicycles feel different than others? At the Royal Gazelle bicycle factory there is a vast amount of knowledge about the relation between bicycle geometry and handling. This knowledge is based on experience, and with this experience new bicycles are designed in an evolutionary manner. Academic research on bicycle dynamics and control (handling) has created theoretical knowledge on dynamics and control for bicycles [1,2]. There is a wish to make a connection between the two, by classifying geometry designs as used by Gazelle in a standard manner and relate them to the dynamical behavior as predicted by the recent theoretical bicycle models [2]. This could lead to a revolution in bicycle design.

**Assignment:** Make an inventory of the standard geometries used at the Gazelle factory, measure these and put them into the JBike6 model [3]. Also make an estimate on the rider posture for every geometry. Interview the Gazelle designers about the dynamic behavior and handling characteristics of every geometry. Study the dynamical behavior of the standard geometries in JBike6 and estimate the handling characteristics from these models. Relate the subjective handling characteristic as perceived by the designer to the objective dynamical behavior as predicted by the JBike6 model. Test these results by looking at two designs; a failure and a success.

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 [2] J. P. Meijaard, Jim M. Papadopoulos, Andy Ruina, A. L. Schwab, 2007 "Linearized dynamics equations for the balance and steer of a bicycle: a benchmark and review," Proceedings of the Royal Society A 463:1955-1982.  
 [3] JBike6 <http://bicycle.tudelft.nl/schwab/Bicycle/JBike6>