# L08: Local regression model

“Well, here goes nothing.”

Dr. Lora Baines, Tron

### Things we cover in this session

- Local regression models for non-linear fitting between two samples
- Predicting variable values using simple local regression models

### Things you need for this session

- W08-1 Non-linear prediction

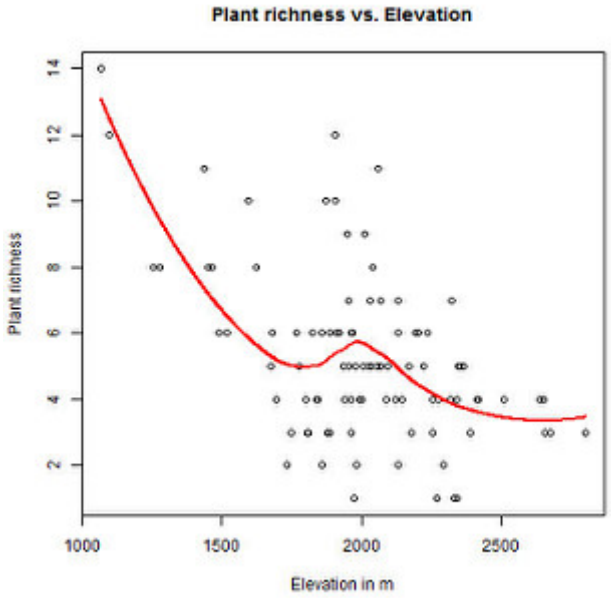
### Things to take home from this session

At the end of this session you should be able to

- compute a local regression between two variables
- predict values based on local regression models

## Local regression models

While the linear regression models assume a linear relationship between a dependent (e.g. y) and one ore more independent variables (e.g. x), non-linear models do not have this restriction. As a drawback, non-linear models can be quite complicated to define if one is looking for a non-linear model which describes the entire data set but local regression models do not have this drawback.




Non-parametric local regression models (loess) use simple linear or quadratic models (i.e. polynomial functions of first or second degree) which are used for a local weighted fit on the data set using a moving window. For example, if the span of this window is set to 7, then only the neighboring 3 lower and higher values are considered for the fit of the central value. A cubic (i.e. $x^3$) weighing function ensures that the actual central value has the largest influence on the fit with decreasing weights towards the end of each sides span.

Regarding validation of such models, a look at its residual standard error gives you a first idea. However, to get a better idea of the reliability of the model when it comes to prediction, the leave-one-out approach from L06 is a better starting point.

# Time for practice

W08-1 Non-linear prediction

---

**Note on data used for illustrating analysis** The analysis used for illustration on this site are based on data from a field survey of areas in the Fogo natural park in 2007 by K. Mauer. For more information, please refer to this report.