

My Research...In regression

- **Area One**

- **Robust Estimation and Robust Inference
in Regression**

Detecting multivariate outliers

Accommodating outliers

Efficient inferential procedures in
presence of outliers

Area Two....



- **Parametric, nonparametric and semiparametric regression**
- **Parametric**
 - General Linear Models**
 - Generalized Linear Models**
 - Eg, logistic and Poisson regression
 - Mixed Models**
 - Linear and Nonlinear Regression with both fixed and random effects

Examples....



Estimating the probability that a projectile will penetrate armor

0/1 data: logistic regression

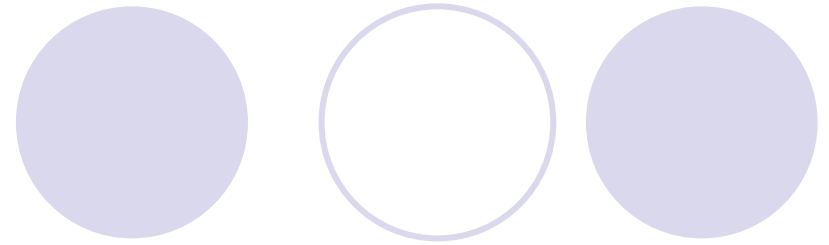
Estimating the strength of particle board

nonlinear regression

Estimating the dose of drug required to achieve a desired response

inverse regression

Nonparametric...



- Kernel based methods:

 - Local maximum likelihood methods
based on kernel weights

- Spline based methods:

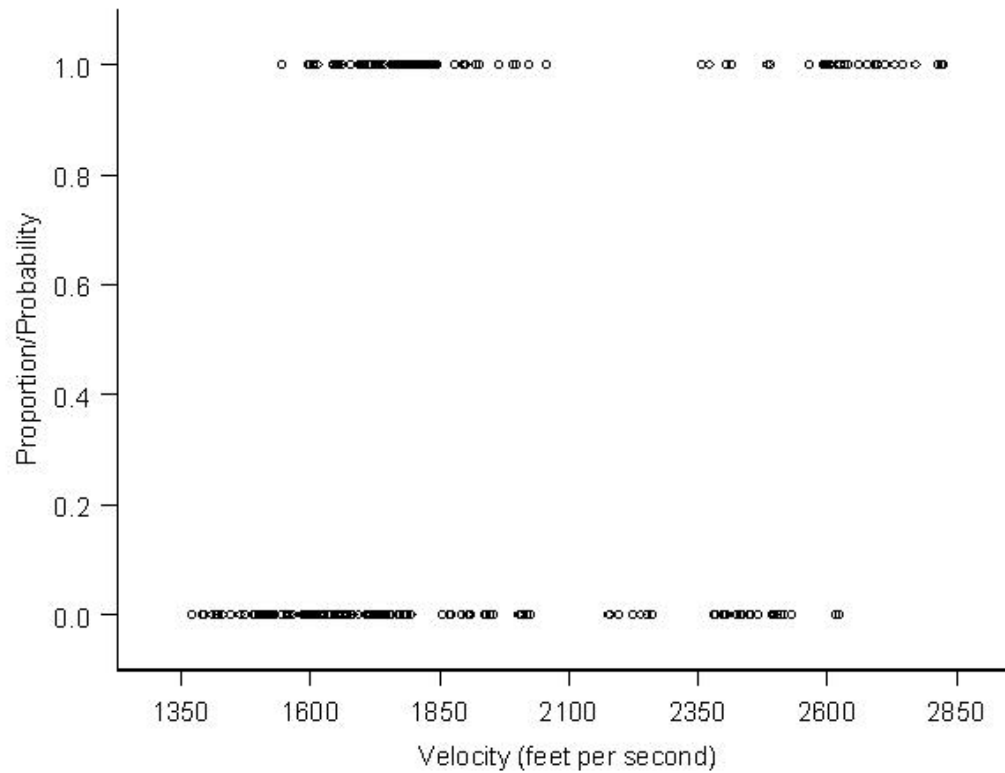
 - Mixed model formulation

Semiparametric...

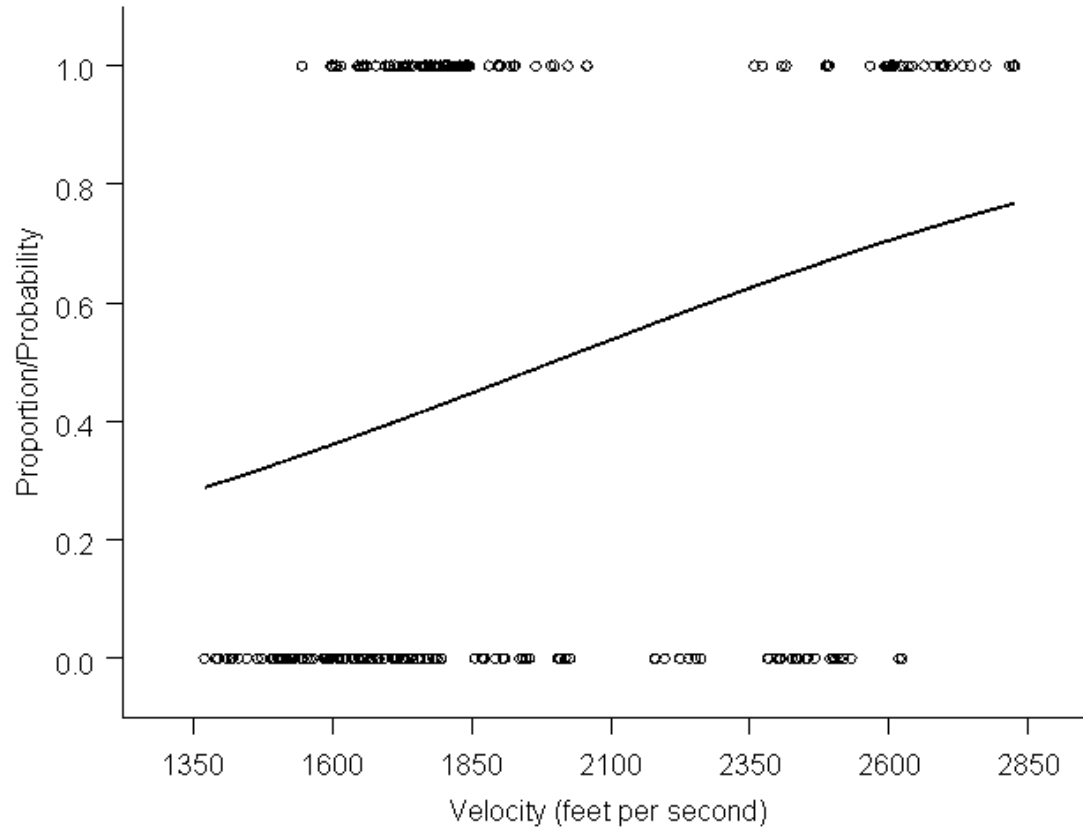
- Combining parametric and nonparametric methods
- Our technique:

Model Robust Regression

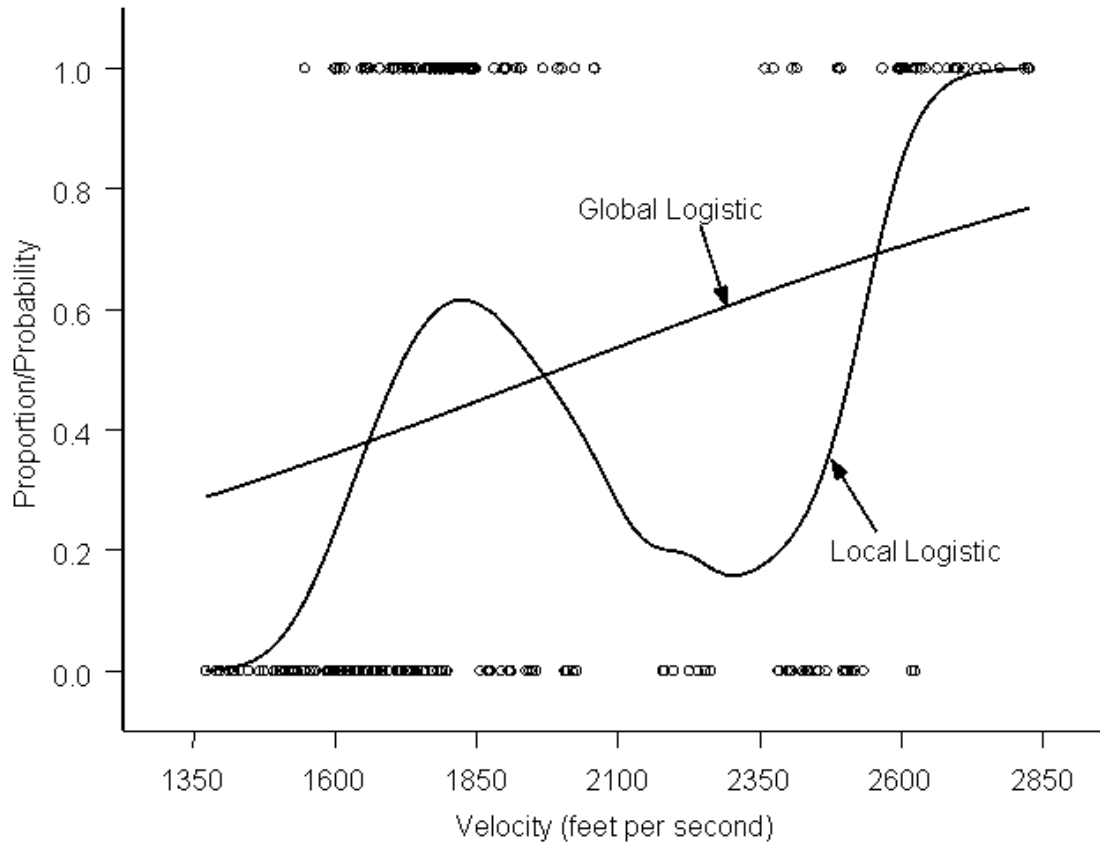
Projectile Penetration Data..



Parametric model: Logistic Regression



Nonparametric Regression: Local Logistic Regression





Current Research...

- Willis Jensen:

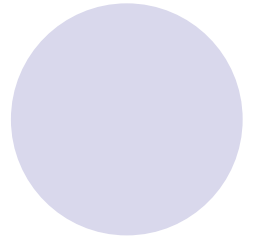
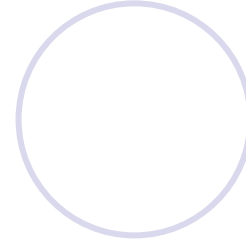
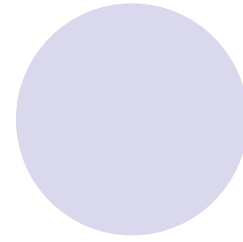
Quality Control and Profile Monitoring:

Detection of Multivariate Outliers

Linear Mixed Models

Nonlinear Mixed Models

Stephanie Pickle:



Response Surface Methodology

Using **Model Robust Regression** to improve
designs in the presence of model
misspecification