1 Our SAS programs

- **MISCLASSIFICATION**
  
  `proprbias.sas.`
  Calculates and plots bias and relative bias with misclassification in estimating a proportion based on a random sample. Loops through various combinations of the true proportion, sensitivity and specificity.

  `propextb.sas.`
  Corrected estimates and confidence interval for a proportion in the presence of misclassification with sensitivity and specificity estimated from external validation data. Includes bootstrap analysis.

  `propext2.sas.`
  Corrected estimates and confidence interval for a proportion in the presence of misclassification with sensitivity and specificity assumed known.

  `proviv.sas.`
  Corrected estimate and confidence interval for a proportion in the presence of misclassification with sensitivity and specificity estimated from internal validation data. Uses maximum likelihood.

- **22oneext.sas.** Analysis of two by two table with misclassification in one of the variables using estimates from external validation data. Allows differential or non-differential misclassification, but data layout assumes validation data includes the nonmisclassified variable so differential misclassification can be considered. Design can be either overall random or stratified on the perfectly observed variable. Some further notes in program.

- **Simple Linear Regression:**

  `slrk:` Correcting for measurement error with error in X only and known M.E. variance, with bootstrapping.

  `slrest:` Correcting for measurement error with error in both variables with bootstrapping.

  `meslrperd:` Measurement error (possibly in both variables). Prediction.

- **MULTIPLE LINEAR REGRESSION.**

  `mregdef:` Multiple Linear regression. Defoliation example. No bootstrap.

  `mregla :` Multiple Linear regression. LA example. Bootstrap.

  `dietiv :` Linear regression with instrumental variables; diet example.

- **Logistic Regression.**


  `melogsimex:` Logistic regression with one variable. SIMEX, estimates only.

- **Nonlinear regression**

  `defnlin This fits defoliation linear in log(x) using various methods`

  `cancer2 Fitting poisson using RC with bootstrap`
2 Stata Programs.

There are two main sets of relevant programs. Both need to be downloaded. In addition to these, which are described below, there is also a command \texttt{eivreg} which is built into Stata, but is fairly limited.

- The first set, created by Ray Carroll and colleagues include \texttt{rcal}, \texttt{simex} (and \texttt{simexplot}) and a related command \texttt{qvf}. A link to information on these, including downloading instructions is:  
  \url{http://www.stata.com/merror/}

- The second set is associated with \texttt{gllaamm} (developed by Rabe-Hesketh, Pickles and Skondral). The command \texttt{cme} fits measurement error models with one mismeasured variable and replication using a normal based likelihood approach. There are other ME problems that can be handled through \texttt{GLAMM}.
  \url{http://www.gllamm.org}

The Stata Journal, vol 3, number 4 (2003) (available for purchase through Stata) is mostly dedicated to measurement error and has five papers associated with the first set of programs and one associated with the second. GLLAMM is also described and illustrated in detail in the book by Rabe-Hesketh and Skondral.

3 Logan/Spiegelman SAS BLINPLUS macro.

The link to these is  
\url{http://www.hsph.harvard.edu/faculty/spiegelman/blinplus.html}

These programs use internal or external validation data with an assumed linear Berkson error model. Use regression calibration estimates. Handles linear regression, logistic regression and proportional hazards models.

4 Other Software.

- "\textit{Statistical Research Software for Measurement Error Methods}". Demonstrates new Web-based methods developed at Dartmouth to analyze and design studies with measurement error.  
  \url{http://biostat.hitchcock.org/research.asp}

  Includes
  - Measurement Error Analysis for Longitudinal Data
  - Measurement Error For Generalized Linear Models when the Covariate is a Proportion
  - Power Calculation for Logistic Regression with Measurement Error
  - Sample Size Calculation for Logistic Regression with Measurement Error
5  **SPlus and R.**

See some notes in Gustafson’s book. Other available programs? Looks like more are becoming available.