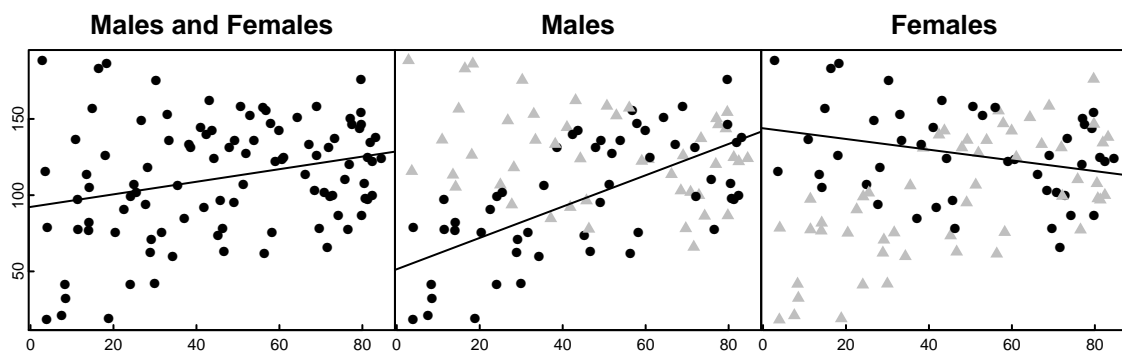


# BIOS 600 · Quiz 12.3: Linear Regression

Fall 2011

1. **Honor Pledge:** I have neither given nor received unauthorized aid on this assignment.  
(Sign and print your name.)

2. The following example demonstrates the benefit of multiple linear regression. Consider the left plot. It is a scatter plot of AGE and Y. The linear regression line is plotted and there appears to be positive association between the two variables. Now consider the center and right plot. In these plots, we consider the relationship of AGE and Y for each gender. Notice that the relationship is between Y and AGE depends on gender. For males, the association appears to be positive. For females, the association appears to be negative. A multiple linear regression model allows us to model the relationship of AGE and GENDER with Y.



The following computer output provides the estimates of the multiple linear regression model.

```
               coef.est  coef.se
Intercept for F   143.87     9.59
Intercept for M    51.44     8.59
Slope for F       -0.35     0.18
Slope for M        1.03     0.17
---
n = 100, k = 4
residual sd = 29.75, R-Squared = 0.94
```

- (a) Please interpret the -0.35 value. What does it represent?
- (b) Predict the value of Y for a female at age 40.
- (c) Predict the value of Y for a male at age 40.
- (d) What is the estimate of  $\sigma^2$  in this regression model?