**U Wroclaw, Fall 2015**
**Applied Stats**
**DISCUSSION/LAB 7: MULTIPLE LINEAR REGRESSION**

We will use data set: cheese.MTW (.xlsx).

**Goal: Using stepwise regression and best subsets regression find a model of taste on the predictors that you think is "best".**

**TO DO:**

- Compare the results of the techniques,
- Explain how you decided on your "best" model, and write the final model.

**SOLUTIONS- LAB WORK**

**Best Subsets Regression: taste versus acetic, h2s, lactic**

```
Response is taste

                                                    a   l
                                                    c   a
                                                    e   c
                                                    t h t
                R-Sq    R-Sq  Mallows             i 2 i
Vars  R-Sq   (adj)   (pred)       Cp        S     c s c
   1  57.1    55.6    51.9      6.0   10.833       X
   1  49.6    47.8    42.9     11.6   11.745         X
   2  65.2    62.6    59.1      2.0   9.9424       X X
   2  58.2    55.1    49.4      7.2   10.890     X X
   3  65.2    61.2    55.6      4.0   10.131     X X X
```

**Regression Analysis: taste versus acetic, h2s, lactic**

**Forward Selection of Terms**

```
Candidate terms: acetic, h2s, lactic

             ----Step 1----     -----Step 2----
              Coef        P      Coef        P
Constant     -9.79             -27.59
h2s          5.776    0.000      3.95    0.002
lactic                           19.89    0.019

S                   10.8334           9.94236
R-sq                 57.12%            65.17%
R-sq(adj)            55.58%            62.59%
R-sq(pred)           51.87%            59.08%
Mallows' Cp            6.02              2.01

α to enter = 0.25

Model Summary
      S    R-sq  R-sq(adj)  R-sq(pred)
10.8334  57.12%     55.58%      51.87%
Regression Equation
taste = -9.79 + 5.776 h2s
```

## Regression Analysis: taste versus h2s

## Regression Analysis: taste versus acetic, h2s, lactic

**Backward Elimination of Terms**

Candidate terms: acetic, h2s, lactic

| | ----Step 1---- | | -----Step 2---- | |
|---|---|---|---|---|
| | Coef | P | Coef | P |
| Constant | -28.9 | | -27.59 | |
| acetic | 0.33 | 0.942 | | |
| h2s | 3.91 | 0.004 | 3.95 | 0.002 |
| lactic | 19.67 | 0.031 | 19.89 | 0.019 |
| S | 10.1307 | | 9.94236 | |
| R-sq | 65.18% | | 65.17% | |
| R-sq(adj) | 61.16% | | 62.59% | |
| R-sq(pred) | 55.60% | | 59.08% | |
| Mallows' Cp | 4.00 | | 2.01 | |

α to remove = 0.1

Model Summary

| S | R-sq | R-sq(adj) | R-sq(pred) |
|---|---|---|---|
| 9.94236 | 65.17% | 62.59% | 59.08% |

Regression Equation

taste = -27.59 + 3.95 h2s + 19.89 lactic

## Regression Analysis: taste versus acetic, h2s, lactic

**Stepwise Selection of Terms**

Candidate terms: acetic, h2s, lactic

| | ----Step 1---- | | -----Step 2---- | |
|---|---|---|---|---|
| | Coef | P | Coef | P |
| Constant | -9.79 | | -27.59 | |
| h2s | 5.776 | 0.000 | 3.95 | 0.002 |
| lactic | | | 19.89 | 0.019 |
| S | 10.8334 | | 9.94236 | |
| R-sq | 57.12% | | 65.17% | |
| R-sq(adj) | 55.58% | | 62.59% | |
| R-sq(pred) | 51.87% | | 59.08% | |
| Mallows' Cp | 6.02 | | 2.01 | |

α to enter = 0.15, α to remove = 0.15

Regression Equation

taste = -27.59 + 3.95 h2s + 19.89 lactic