**Machine Learning**

**Draft Schedule (updated 02/24/19)**

Day 1

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| ***Start*** | ***End*** | ***Instructor / Location*** | ***TA*** | ***Session*** |
| 8:00 | 8:30 |  |  | Breakfast and Check-in |
| 8:30 | 8:45 | Cody |  | Intro/Opening remarks |
| 8:45 | 10:00 | Cody | Serena | Intro to R |
| 10:00 | 10:15 |  |  | Break |
| 10:15 | 10:45 | Cody |  | Lecture: Low vs High-Dimensional data,  Problems, challenges and approaches |
| 10:45 | 12:00 | Cody |  | Lecture: ‘Classical‘ vs ‘New’ methodologies  Lecture: Penalized Regression Methods  (Ridge + Lasso) |
| 12:00 | 1:00 |  |  | Networking Lunch |
| 1:00 | 2:30 | Cody |  | Lab: Penalized Regression Methods  - Model fitting  - Feature selection, validation, overcome overfitting |
| 2:30 | 3:00 | Yifei |  | Lecture/Lab??: Non-Linear Regression (briefly discuss, e.g., kernel, splines) |
| 3:00 | 3:15 |  |  | Break |
| 3:15 | 4:45 | Noah |  | Lecture/Lab: Classification Models  - Logistic regression  - Support Vector Machine (SVM) (biomarker example) |
| 4:45 | 5:00 |  |  | Questions and wrap-up |

Day 2

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| ***Start*** | ***End*** | ***Instructor / Location*** | ***TA*** | ***Session*** |
| 8:00 | 8:30 |  |  | Breakfast |
| 8:30 | 8:45 | Cody/Noah/Yifei |  | Recap from Day 1: QAs |
| 8:45 | 10:00 | Noah | Lizzy | Lecture/Lab: Decision Trees -> Random Forest |
| 10:00 | 10:15 |  |  | Break |
| 10:15 | 12:00 | Yifei | Lizzy | Lecture/Lab: Predict Survival Outcomes (e.g., Cox Regression + Lasso, survival trees) |
| 12:00 | 1:00 |  |  | Networking Lunch |
| 1:00 | 2:15 | Yifei |  | Lecture/Lab: Clustering Algorithms |
| 2:15 | 3:30 | Yifei |  | Lecture/Lab: Principal components analysis (PCA) |
| 3:30 | 3:45 |  |  | Break |
| 3:45 | 4:45 | Noah | Lizzy | Lecture: Deep Learning - brief tutorial, PROs/CONs of most popular approaches |
| 4:45 | 5:00 |  |  | Evaluation, Questions and wrap-up |