

# **Analysis of Variance for Metabolites Identified in Salmon Smolts Exposed to Crude Oil**

吳宏達  
中興大學應用數學系

## **Abstract**

Migrating salmon are possibly impacted by the crude-oil pollution due to maritime transportation. For tissue samples collected from surviving salmon smolts, distinct metabolites were measured by one-dimensional  $^1\text{H}$  nuclear magnetic resonance spectroscopy. The age-dependent ANOVA results, replicated at several exposure levels, reveal the need of combining information across experiments to improve statistical power. This is achieved through the use of non-centrality parameter appeared in the non-central chi-square sampling distribution under ANOVA settings. We explore likelihood-based approaches in this study. As the horizontal truncations in binning (a preprocessing step) could lead to biased ANOVA results, parametric modeling of the truncation is considered to reduce the bias to an acceptable extent.