



**Joint MUMS Program Transition - SPUQ Workshop**  
**May 14-17, 2019**  
**SPEAKER/ABSTRACT**

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*“cmenet: a new method for bi-level variable selection of conditional main effects”*

**Abstract:**

This talk introduces a novel variable selection method for conditional main effects (CMEs), which capture the conditional effect of a factor given a fixed level of another factor. CMEs represent interpretable, domain-specific phenomena for a wide range of applications in the physical and social sciences. The key challenge is in incorporating the grouped structure of CMEs within the variable selection procedure itself. We propose a new method, cmenet, which employs two principles (CME coupling and CME reduction) to effectively navigate the selection algorithm. In simulated tests where CMEs are indeed present, cmenet provides improved performance over standard variable selection and interaction analysis methods. Applied to real-world gene association studies, cmenet not only gives more parsimonious models and improved predictive performance over existing methods, but also reveals important insights on gene activation behavior which can guide further experiments.