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**Topic: Dealing with Confounders in Omics Analysis**

**Abstract:**

The Anna Karenina effect is a manifestation of the theory–practice gap that exists when theoretical statistics are applied on real-world data. In the course of analyzing biological data for differential features such as genes or proteins, it derives from the situation where the null hypothesis is rejected for extraneous reasons (or confounders), rather than because the alternative hypothesis is relevant to the disease phenotype. The mechanics of applying statistical tests therefore must address and resolve confounders. It is inadequate to simply rely on manipulating the P-value; indeed, we show how/why this can be the wrong thing to do!) We discuss three mechanistic elements (hypothesis statement construction, null distribution appropriateness, and test-statistic construction) with real-life examples in computational biology, and suggest how they can be designed to foil the Anna Karenina effect to select phenotypically relevant biological features. (This talk is based on joint work with Wilson Wen Bin Goh.)

**Bio:**

Limsoon Wong is Kwan-Im-Thong-Hood-Cho-Temple Chair Professor in the School of Computing at the National University of Singapore (NUS). He was also a professor (now honorary) of pathology in the Yong Loo Lin School of Medicine at NUS. Limsoon currently works mostly on knowledge discovery technologies and their application to biomedicine and data analytics. He is a Fellow of the ACM, inducted in 2013 for his many contributions to database theory and computational biology. His other recent awards include the 2003 FEER Asian Innovation Gold Award for his work on treatment optimization of childhood leukemias, and the ICDT 2014 Test of Time Award for his work on naturally embedded query languages. He co-founded Molecular Connections Pvt Ltd in India in the early 2000s and served as the company's chairman for a decade and a half, helped helm the steady growth of the company to over 2000 engineers, scientists, and curators, and some 400x increase in value. Limsoon received his BSc(Eng) in 1988 from Imperial College London and his PhD in 1994 from University of Pennsylvania.